GE Medical Systems

Technical Publications

Direction 2273022-100
Revision 23

Proteus XR/a System (32, 50, 65, 80kW)

Service Manual

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Service Documentation

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Direction 2273022-100
Revision 22

Proteus XR/a System Service Manual

IMPORTANT! . . . X-RAY PROTECTION

X-Ray equipment if not properly used may cause injury. Accordingly, the instructions herein contained should be thoroughly read and understood by everyone who will use the equipment before you attempt to place this equipment in operation. The General Electric Medical Systems Group, will be glad to assist and cooperate in placing this equipment in use.

Although this apparatus incorporates a high degree of protection against x-radiation other than the useful beam, no practical design of equipment can provide complete protection. Nor can any practical design compel the operator to take adequate precautions to prevent the possibility of any persons carelessly exposing themselves or others to radiation.

It is important that everyone having anything to do with x-radiation be properly trained and fully acquainted with the recommendations of the National Council on Radiation Protection and Measurements as published in NCRP Reports available from NCRP Publications, 7910 Woodmont Avenue, Room 1016, Bethesda, Maryland 20814, and of the International Commission on Radiation Protection, and take adequate steps to protect against injury.

The equipment is sold with the understanding that the General Electric Company, Medical Systems Group, its agents, and representatives have no responsibility for injury or damage which may result from improper use of the equipment.

Various protective material and devices are available. It is urged that such materials or devices be used.

CAUTION: United States Federal law restricts this device to use by or on the order of a physician.

If you have any comments, suggestions or corrections to the information in this document, please write them down, include the document title and document number, and send them to:

GENERAL ELECTRIC MEDICAL SYSTEMS

MANAGER – INFORMATION INTEGRATION,
AMERICAS W–622
P.O. BOX 414
MILWAUKEE, WI 53201–0414

CERTIFIED ELECTRICAL CONTRACTOR STATEMENT

All electrical installations that are preliminary to positioning of the equipment at the site prepared for the equipment shall be performed by licensed electrical contractors. In addition, electrical feeds into the Power Distribution Unit shall be performed by licensed electrical contractors. Other connections between pieces of electrical equipment, calibrations, and testing shall be performed by qualified GE Medical personnel. The products involved (and the accompanying electrical installations) are highly sophisticated, and special engineering competence is required. In performing all electrical work on these products, GE will use its own specially trained field engineers. All of GE's electrical work on these products will comply with the requirements of the applicable electrical codes.

The purchaser of GE equipment shall only utilize qualified personnel (i.e., GE's field engineers, personnel of third-party service companies with equivalent training, or licensed electricians) to perform electrical servicing on the equipment.

DAMAGE IN TRANSPORTATION

All packages should be closely examined at time of delivery. If damage is apparent, have notation "**damage in shipment**" written on **all** copies of the freight or express bill **before** delivery is accepted or "signed for" by a General Electric representative or a hospital receiving agent. Whether noted or concealed, damage **MUST** be reported to the carrier **immediately** upon discovery, or in any event, within **14** days after receipt, and the contents and containers held for inspection by the carrier. A transportation company will not pay a claim for damage if an inspection is not requested within this **14** day period.

Call Traffic and Transportation, Milwaukee, WI (414) 827–3449 / 8*285–3449 **immediately** after damage is found. At this time be ready to supply name of carrier, delivery date, consignee name, freight or express bill number, item damaged and extent of damage.

Complete instructions regarding claim procedure are found in Section "S" of the Policy & Procedure Bulletins.

REGULATORY REQUIREMENTS

This product conforms with the requirements of Council Directive 93/42/EEC concerning medical devices when it bears the following CE marking of conformity:

CE 0459

Electromagnetic Compatibility (EMC)

This product conforms with IEC60601-1-2:2001 EMC standard for medical devices.

Note: This equipment generates, uses, and can radiate radio frequency energy. The equipment may cause or subject to radio frequency interference with other medical and non–medical devices and radio communications. To provide reasonable protection against such interference, the Proteus XR/a System (32, 50, 65, 80kW) complies with emissions limits for a Group 1, Class A Medical Devices and has applicable immunity level as stated in EN 60601-1-2:2001.

However, there is no guarantee that interference will not occur in a particular installation. Special precautions and other information regarding EMC provided in the accompanying documents of this equipment shall be observed during installation and operation of this equipment.

Note: If this equipment is found to cause interference (which may be determined by switching the equipment on and off), the user (or qualified service personnel) should attempt to correct the problem by one or more of the following measure(s):

- Reorient or relocate the affected device(s).
- Increase the separating space between the equipment and the affected device.
- Power the equipment from a source different from that of the affected device.
- Consult the point of purchase or service representative for further suggestions.

WARNING Use of accessories, transducers, cables and other parts other than those specified by the manufacturer of this equipment may result in increased emissions or decreased immunity of the equipment. The manufacturer is not responsible for any interference caused either by the use of interconnect cables other than those recommended, or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

Note: To comply with the regulations applicable to an electromagnetic interface for a Group 1, Class A Medical Device, and to minimize interference risks, the following requirements shall apply:

- All interconnect cables to peripheral devices must be shielded and properly grounded. Use of cables not properly shielded and grounded may result in the equipment causing radio frequency interference in violation of the European Union Medical Device directive and FCC regulations.
- All of those recommended guidance regarding electromagnetic environment shall be followed.

Note: Do not use devices which intentionally transmit RF signals (Cellular Phones, Transceivers, or Radio Controlled Products) in the vicinity of this equipment as it may cause performance outside the published specifications. Keep the power to these type devices turned off when near the equipment. The medical staff in charge of this equipment is required to instruct technicians, patients, and others.

Guidance and manufacturer’s declaration – Electromagnetic Emissions

The **Proteus XR/a system** is suitable for use in the specified electromagnetic environment. The purchaser or user of the **Proteus XR/a system** should assure that it is used in an electromagnetic environment as described below:

Emissions Test	**Compliance**	**Electromagnetic Environment**
RF Emissions CISPR11	Group1	The Proteus XR/a system uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF Emissions CISPR11	Class A	The Proteus XR/a system is suitable for use in all establishments other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

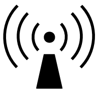
Guidance and manufacturer’s declaration - Electromagnetic Immunity (1)

The **Proteus XR/a system** is suitable for use in the specified electromagnetic environment. The purchaser or user of the **Proteus XR/a system** should assure that it is used in an electromagnetic environment as described below:

Immunity Test	**IEC 60601-1-2 Test Level**	**Compliance Level**	**Electromagnetic Environment**
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors are wood, concrete, or ceramic tile, or floors are covered with synthetic material and the relative humidity is at least 30 %.
Electrical fast transient/burst IEC 61000-4-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality is that of a typical commercial and/or hospital environment
Surge IEC 61000-4-5	±1 kV differential mode ±2 kV common mode	±1 kV differential mode ±2 kV common mode	Mains power quality is that of a typical commercial and/or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5 % U_T (> 95 % dip in U_T) for 0.5 cycle 40 % U_T (60 % dip in U_T) for 5 cycles 70 % U_T (30 % dip in U_T) < 5 % U_T (> 95 % dip in U_T) for 5 s	0 % U_T for 5 sec	Mains power quality is that of a typical commercial and/or hospital environment. If the user of the Proteus XR/a system requires continued operation during power mains interruptions, it is recommended that the Proteus XR/a system be powered from an uninterruptible power supply or a battery.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields are at levels characteristic of a typical location in a typical commercial and/or hospital environment.

Note: These are guidelines. Actual conditions may vary.

Guidance and manufacturer’s declaration - Electromagnetic Immunity (2)

<table>
<tr><td colspan="4">The Proteus XR/a system is suitable for use in the specified electromagnetic environment. The purchaser or user of the Proteus XR/a system should assure that it is used in an electromagnetic environment as described below:</td></tr>
<tr><th>Immunity Test</th><th>IEC 60601-1-2 Test Level</th><th>Compliance Level</th><th>Electromagnetic Environment</th></tr>
<tr><td></td><td></td><td></td><td>Portable and mobile RF communications equipment are used no closer to any part of the [EQUIPMENT and/or SYSTEM], including cables, than the recommended separation distance calculated from the equation appropriate for the frequency of the transmitter.
Recommended separation distance</td></tr>
<tr><td>Conducted RF
IEC 61000-4-6</td><td>3 V
150 kHz to 80 MHz</td><td>[V$_1$ =] 3 V</td><td>d= 1.2$\sqrt{P}$
d= 1.2$\sqrt{P}$ 80 MHz to 800 MHz
d= 2.3$\sqrt{P}$ 800 MHz to 2,5 GHz</td></tr>
<tr><td>Radiated RF
IEC 61000-4-3</td><td>3 V/m
80 kHz to 800 MHz</td><td>[E$_1$=] 3 V/m</td><td>Note: P is the power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m).
Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,* are less than the compliance level in each frequency range.**
Interference may occur in the vicinity of equipment marked with the following symbol:
</td></tr>
<tr><td colspan="4">NOTE 1 At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2 These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.</td></tr>
<tr><td colspan="4">*Field strengths from fixed transmitters, such as base stations for cellular telephones and land mobile radios, amateur radio, AM and FM radio broadcast, and TV broadcast cannot be estimated accurately. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be performed. If the measured field strength exceeds the RF compliance level above, observe the Proteus XR/a system to verify normal operation in each use location. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the [EQUIPMENT and/or SYSTEM].
**Over the frequency range 150 kHz to 80 MHz, field strengths are less than 3 V/m.
The Recommended Separation Distances are listed in the next table.
Note: These are guidelines. Actual conditions may vary.</td></tr>
</table>

Recommended Separation Distances for Portable and Mobile RF Communications Equipment and the **Proteus XR/a system**

Frequency of Transmitter	**150KHz to 80 MHz**	**80 MHz to 800 MHz**	**800 MHz to 2,5 GHz**
Equation	d= $1.2\sqrt{P}$	d= $1.2\sqrt{P}$	d= $2.3\sqrt{P}$
Rated Power of Transmitter (W)	**DISTANCE (meters)**	**DISTANCE (meters)**	**DISTANCE (meters)**
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a power not listed above, the **DISTANCE** can be estimated using the equation in the corresponding column, where P is the power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note: These are guidelines. Actual conditions may vary.

LANGUAGE

ПРЕДУПРЕЖДЕНИЕ
(BG)

- ТОВА УПЪТВАНЕ ЗА РАБОТА Е НАЛИЧНО САМО НА АНГЛИЙСКИ ЕЗИК.
- АКО ДОСТАВЧИКЪТ НА УСЛУГАТА НА КЛИЕНТА ИЗИСКА ЕЗИК, РАЗЛИЧЕН ОТ АНГЛИЙСКИ, ЗАДЪЛЖЕНИЕ НА КЛИЕНТА Е ДА ОСИГУРИ ПРЕВОД.
- НЕ ИЗПОЛЗВАЙТЕ ОБОРУДВАНЕТО ПРЕДИ ДА СТЕ СЕ КОНСУЛТИРАЛИ И РАЗБРАЛИ УПЪТВАНЕТО ЗА РАБОТА.
- НЕСПАЗВАНЕТО НА ТОВА ПРЕДУПРЕЖДЕНИЕ МОЖЕ ДА ДОВЕДЕ ДО НАРАНЯВАНЕ НА ДОСТАВЧИКА НА УСЛУГАТА, ОПЕРАТОРА ИЛИ ПАЦИЕНТ В РЕЗУЛТАТ НА ТОКОВ УДАР ИЛИ МЕХАНИЧНА ИЛИ ДРУГА ОПАСНОСТ.

警告
(ZH-CN)

- 本维修手册仅提供英文版本。
- 如果维修服务提供商需要非英文版本，客户需自行提供翻译服务。
- 未详细阅读和完全理解本维修手册之前，不得进行维修。
- 忽略本警告可能对维修人员，操作员或患者造成触电、机械伤害或其他形式的伤害。

VÝSTRAHA
(CS)

- TENTO PROVOZNÍ NÁVOD EXISTUJE POUZE V ANGLICKÉM JAZYCE.
- V PŘÍPADĚ, ŽE EXTERNÍ SLUŽBA ZÁKAZNÍKŮM POTŘEBUJE NÁVOD V JINÉM JAZYCE, JE ZAJIŠTĚNÍ PŘEKLADU DO ODPOVÍDAJÍCÍHO JAZYKA ÚKOLEM ZÁKAZNÍKA.
- NESNAŽTE SE O ÚDRŽBU TOHOTO ZAŘÍZENÍ, ANIŽ BYSTE SI PŘEČETLI TENTO PROVOZNÍ NÁVOD A POCHOPILI JEHO OBSAH.
- V PŘÍPADĚ NEDODRŽOVÁNÍ TÉTO VÝSTRAHY MŮŽE DOJÍT K PORANĚNÍ PRACOVNÍKA PRODEJNÍHO SERVISU, OBSLUŽNÉHO PERSONÁLU NEBO PACIENTŮ VLIVEM ELEKTRICKÉHOP PROUDU, RESPEKTIVE VLIVEM MECHANICKÝCH ČI JINÝCH RIZIK.

ADVARSEL
(DA)

- DENNE SERVICEMANUAL FINDES KUN PÅ ENGELSK.
- HVIS EN KUNDES TEKNIKER HAR BRUG FOR ET ANDET SPROG END ENGELSK, ER DET KUNDENS ANSVAR AT SØRGE FOR OVERSÆTTELSE.
- FORSØG IKKE AT SERVICERE UDSTYRET MEDMINDRE DENNE SERVICEMANUAL HAR VÆRET KONSULTERET OG ER FORSTÅET.
- MANGLENDE OVERHOLDELSE AF DENNE ADVARSEL KAN MEDFØRE SKADE PÅ GRUND AF ELEKTRISK, MEKANISK ELLER ANDEN FARE FOR TEKNIKEREN, OPERATØREN ELLER PATIENTEN.

WAARSCHUWING

(NL)

- DEZE ONDERHOUDSHANDLEIDING IS ENKEL IN HET ENGELS VERKRIJGBAAR.
- ALS HET ONDERHOUDSPERSONEEL EEN ANDERE TAAL VEREIST, DAN IS DE KLANT VERANTWOORDELIJK VOOR DE VERTALING ERVAN.
- PROBEER DE APPARATUUR NIET TE ONDERHOUDEN VOORDAT DEZE ONDERHOUDSHANDLEIDING WERD GERAADPLEEGD EN BEGREPEN IS.
- INDIEN DEZE WAARSCHUWING NIET WORDT OPGEVOLGD, ZOU HET ONDERHOUDSPERSONEEL, DE OPERATOR OF EEN PATIËNT GEWOND KUNNEN RAKEN ALS GEVOLG VAN EEN ELEKTRISCHE SCHOK, MECHANISCHE OF ANDERE GEVAREN.

WARNING

(EN)

- THIS SERVICE MANUAL IS AVAILABLE IN ENGLISH ONLY.
- IF A CUSTOMER'S SERVICE PROVIDER REQUIRES A LANGUAGE OTHER THAN ENGLISH, IT IS THE CUSTOMER'S RESPONSIBILITY TO PROVIDE TRANSLATION SERVICES.
- DO NOT ATTEMPT TO SERVICE THE EQUIPMENT UNLESS THIS SERVICE MANUAL HAS BEEN CONSULTED AND IS UNDERSTOOD.
- FAILURE TO HEED THIS WARNING MAY RESULT IN INJURY TO THE SERVICE PROVIDER, OPERATOR, OR PATIENT FROM ELECTRIC SHOCK, OR FROM MECHANICAL OR OTHER HAZARDS.

HOIATUS

(ET)

- KÄESOLEV TEENINDUSJUHEND ON SAADAVAL AINULT INGLISE KEELES.
- KUI KLIENDITEENINDUSE OSUTAJA NÕUAB JUHENDIT INGLISE KEELEST ERINEVAS KEELES, VASTUTAB KLIENT TÕLKETEENUSE OSUTAMISE EEST.
- ÄRGE ÜRITAGE SEADMEID TEENINDADA ENNE EELNEVALT KÄESOLEVA TEENINDUSJUHENDIGA TUTVUMIST JA SELLEST ARU SAAMIST.
- KÄESOLEVA HOIATUSE EIRAMINE VÕIB PÕHJUSTADA TEENUSEOSUTAJA, OPERAATORI VÕI PATSIENDI VIGASTAMIST ELEKTRILÖÖGI, MEHAANILISE VÕI MUU OHU TAGAJÄRJEL.

VAROITUS

(FI)

- TÄMÄ HUOLTO-OHJE ON SAATAVILLA VAIN ENGLANNIKSI.
- JOS ASIAKKAAN HUOLTOHENKILÖSTÖ VAATII MUUTA KUIN ENGLANNINKIELISTÄ MATERIAALIA, TARVITTAVAN KÄÄNNÖKSEN HANKKIMINEN ON ASIAKKAAN VASTUULLA.
- ÄLÄ YRITÄ KORJATA LAITTEISTOA ENNEN KUIN OLET VARMASTI LUKENUT JA YMMÄRTÄNYT TÄMÄN HUOLTO-OHJEEN.
- MIKÄLI TÄTÄ VAROITUSTA EI NOUDATETA, SEURAUKSENA VOI OLLA HUOLTOHENKILÖSTÖN, LAITTEISTON KÄYTTÄJÄN TAI POTILAAN VAHINGOITTUMINEN SÄHKÖISKUN, MEKAANISEN VIAN TAI MUUN VAARATILANTEEN VUOKSI.

ATTENTION

(FR)

- CE MANUEL DE SERVICE N'EST DISPONIBLE QU'EN ANGLAIS.
- SI LE TECHNICIEN DU CLIENT A BESOIN DE CE MANUEL DANS UNE AUTRE LANGUE QUE L'ANGLAIS, C'EST AU CLIENT QU'IL INCOMBE DE LE FAIRE TRADUIRE.
- NE PAS TENTER D'INTERVENIR SUR LES EQUIPEMENTS TANT QUE LE MANUEL SERVICE N'A PAS ETE CONSULTE ET COMPRIS
- LE NON-RESPECT DE CET AVERTISSEMENT PEUT ENTRAÎNER CHEZ LE TECHNICIEN, L'OPÉRATEUR OU LE PATIENT DES BLESSURES DUES À DES DANGERS ÉLECTRIQUES, MÉCANIQUES OU AUTRES.

WARNUNG

(DE)

- DIESE SERVICEANLEITUNG EXISTIERT NUR IN ENGLISCHER SPRACHE.
- FALLS EIN FREMDER KUNDENDIENST EINE ANDERE SPRACHE BENÖTIGT, IST ES AUFGABE DES KUNDEN FÜR EINE ENTSPRECHENDE ÜBERSETZUNG ZU SORGEN.
- VERSUCHEN SIE NICHT DIESE ANLAGE ZU WARTEN, OHNE DIESE SERVICEANLEITUNG GELESEN UND VERSTANDEN ZU HABEN.
- WIRD DIESE WARNUNG NICHT BEACHTET, SO KANN ES ZU VERLETZUNGEN DES KUNDENDIENSTTECHNIKERS, DES BEDIENERS ODER DES PATIENTEN DURCH STROMSCHLÄGE, MECHANISCHE ODER SONSTIGE GEFAHREN KOMMEN.

ΠΡΟΕΙΔΟΠΟΙΗΣΗ

(EL)

- ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ ΔΙΑΤΙΘΕΤΑΙ ΣΤΑ ΑΓΓΛΙΚΑ ΜΟΝΟ.
- ΕΑΝ ΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ ΕΝΟΣ ΠΕΛΑΤΗ ΑΠΑΙΤΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕ ΓΛΩΣΣΑ ΕΚΤΟΣ ΤΩΝ ΑΓΓΛΙΚΩΝ, ΑΠΟΤΕΛΕΙ ΕΥΘΥΝΗ ΤΟΥ ΠΕΛΑΤΗ ΝΑ ΠΑΡΕΧΕΙ ΥΠΗΡΕΣΙΕΣ ΜΕΤΑΦΡΑΣΗΣ.
- ΜΗΝ ΕΠΙΧΕΙΡΗΣΕΤΕ ΤΗΝ ΕΚΤΕΛΕΣΗ ΕΡΓΑΣΙΩΝ ΣΕΡΒΙΣ ΣΤΟΝ ΕΞΟΠΛΙΣΜΟ ΕΚΤΟΣ ΕΑΝ ΕΧΕΤΕ ΣΥΜΒΟΥΛΕΥΤΕΙ ΚΑΙ ΕΧΕΤΕ ΚΑΤΑΝΟΗΣΕΙ ΤΟ ΠΑΡΟΝ ΕΓΧΕΙΡΙΔΙΟ ΣΕΡΒΙΣ.
- ΕΑΝ ΔΕ ΛΑΒΕΤΕ ΥΠΟΨΗ ΤΗΝ ΠΡΟΕΙΔΟΠΟΙΗΣΗ ΑΥΤΗ, ΕΝΔΕΧΕΤΑΙ ΝΑ ΠΡΟΚΛΗΘΕΙ ΤΡΑΥΜΑΤΙΣΜΟΣ ΣΤΟ ΑΤΟΜΟ ΠΑΡΟΧΗΣ ΣΕΡΒΙΣ, ΣΤΟ ΧΕΙΡΙΣΤΗ Ή ΣΤΟΝ ΑΣΘΕΝΗ ΑΠΟ ΗΛΕΚΤΡΟΠΛΗΞΙΑ, ΜΗΧΑΝΙΚΟΥΣ Ή ΑΛΛΟΥΣ ΚΙΝΔΥΝΟΥΣ.

FIGYELMEZTETÉS

(HU)

- EZEN KARBANTARTÁSI KÉZIKÖNYV KIZÁRÓLAG ANGOL NYELVEN ÉRHETŐ EL.
- HA A VEVŐ SZOLGÁLTATÓJA ANGOLTÓL ELTÉRŐ NYELVRE TART IGÉNYT, AKKOR A VEVŐ FELELŐSSÉGE A FORDÍTÁS ELKÉSZÍTTETÉSE.
- NE PRÓBÁLJA ELKEZDENI HASZNÁLNI A BERENDEZÉST, AMÍG A KARBANTARTÁSI KÉZIKÖNYVBEN LEÍRTAKAT NEM ÉRTELMEZTÉK.
- EZEN FIGYELMEZTETÉS FIGYELMEN KÍVÜL HAGYÁSA A SZOLGÁLTATÓ, MŰKÖDTETŐ VAGY A BETEG ÁRAMÜTÉS, MECHANIKAI VAGY EGYÉB VESZÉLYHELYZET MIATTI SÉRÜLÉSÉT EREDMÉNYEZHETI.

AÐVÖRUN

(IS)

- ÞESSI ÞJÓNUSTUHANDBÓK ER EINGÖNGU FÁANLEG Á ENSKU.
- EF AÐ ÞJÓNUSTUVEITANDI VIÐSKIPTAMANNS ÞARFNAST ANNAS TUNGUMÁLS EN ENSKU, ER ÞAÐ SKYLDA VIÐSKIPTAMANNS AÐ SKAFFA TUNGUMÁLAÞJÓNUSTU.
- REYNIÐ EKKI AÐ AFGREIÐA TÆKIÐ NEMA AÐ ÞESSI ÞJÓNUSTUHANDBÓK HEFUR VERIÐ SKOÐUÐ OG SKILIN.
- BROT Á SINNA ÞESSARI AÐVÖRUN GETUR LEITT TIL MEIÐSLA Á ÞJÓNUSTUVEITANDA, STJÓRNANDA EÐA SJÚKLINGS FRÁ RAFLOSTI, VÉLRÆNU EÐA ÖÐRUM ÁHÆTTUM.

AVVERTENZA

(IT)

- IL PRESENTE MANUALE DI MANUTENZIONE E DISPONIBILE SOLTANTO IN INGLESE.
- SE UN ADDETTO ALLA MANUTENZIONE ESTERNO ALLA GEMS RICHIEDE IL MANUALE IN UNA LINGUA DIVERSA, IL CLIENTE E TENUTO A PROVVEDERE DIRETTAMENTE ALLA TRADUZIONE.
- SI PROCEDA ALLA MANUTENZIONE DELL'APPARECCHIATURA SOLO DOPO AVER CONSULTATO IL PRESENTE MANUALE ED AVERNE COMPRESO IL CONTENUTO
- IL NON RISPETTO DELLA PRESENTE AVVERTENZA POTREBBE FAR COMPIERE OPERAZIONI DA CUI DERIVINO LESIONI ALL'ADDETTO ALLA MANUTENZIONE, ALL'UTILIZZATORE ED AL PAZIENTE PER FOLGORAZIONE ELETTRICA, PER URTI MECCANICI OD ALTRI RISCHI.

警告

(JA)

- このサービスマニュアルには英語版しかありません。
- サービスを担当される業者が英語以外の言語を要求される場合、翻訳作業はその業者の責任で行うものとさせていただきます。
- このサービスマニュアルを熟読し理解せずに、装置のサービスを行わないでください。
- この警告に従わない場合、サービスを担当される方、操作員あるいは患者さんが、感電や機械的又はその他の危険により負傷する可能性があります。

경고

(KO)

- 본 서비스 지침서는 영어로만 이용하실 수 있습니다.
- 고객의 서비스 제공자가 영어 이외의 언어를 요구할 경우, 번역 서비스를 제공하는 것은 고객의 책임입니다.
- 본 서비스 지침서를 참고했고 이해하지 않는 한은 해당 장비를 수리하려고 시도하지 마십시오.
- 이 경고에 유의하지 않으면 전기 쇼크, 기계상의 혹은 다른 위험으로부터 서비스 제공자, 운영자 혹은 환자에게 위해를 가할 수 있습니다.

BRĪDINĀJUMS

(LV)

- ŠĪ APKALPES ROKASGRĀMATA IR PIEEJAMA TIKAI ANGĻU VALODĀ.
- JA KLIENTA APKALPES SNIEDZĒJAM NEPIECIEŠAMA INFORMĀCIJA CITĀ VALODĀ, NEVIS ANGĻU, KLIENTA PIENĀKUMS IR NODROŠINĀT TULKOŠANU.
- NEVEICIET APRĪKOJUMA APKALPI BEZ APKALPES ROKASGRĀMATAS IZLASĪŠANAS UN SAPRAŠANAS.
- ŠĪ BRĪDINĀJUMA NEIEVĒROŠANA VAR RADĪT ELEKTRISKĀS STRĀVAS TRIECIENA, MEHĀNISKU VAI CITU RISKU IZRAISĪTU TRAUMU APKALPES SNIEDZĒJAM, OPERATORAM VAI PACIENTAM.

ĮSPĖJIMAS

(LT)

- ŠIS EKSPLOATAVIMO VADOVAS YRA PRIEINAMAS TIK ANGLŲ KALBA.
- JEI KLIENTO PASLAUGŲ TIEKĖJAS REIKALAUJA VADOVO KITA KALBA – NE ANGLŲ, NUMATYTI VERTIMO PASLAUGAS YRA KLIENTO ATSAKOMYBĖ.
- NEMĖGINKITE ATLIKTI ĮRANGOS TECHNINĖS PRIEŽIŪROS, NEBENT ATSIŽVELGĖTE Į ŠĮ EKSPLOATAVIMO VADOVĄ IR JĮ SUPRATOTE.
- JEI NEATKREIPSITE DĖMESIO Į ŠĮ PERSPĖJIMĄ, GALIMI SUŽALOJIMAI DĖL ELEKTROS ŠOKO,
- MECHANINIŲ AR KITŲ PAVOJŲ PASLAUGŲ TIEKĖJUI, OPERATORIUI AR PACIENTUI.

ADVARSEL

(NO)

- DENNE SERVICEHÅNDBOKEN FINNES BARE PÅ ENGELSK.
- HVIS KUNDENS SERVICELEVERANDØR TRENGER ET ANNET SPRÅK, ER DET KUNDENS ANSVAR Å SØRGE FOR OVERSETTELSE.
- IKKE FORSØK Å REPARERE UTSTYRET UTEN AT DENNE SERVICEHÅNDBOKEN ER LEST OG FORSTÅTT.
- MANGLENDE HENSYN TIL DENNE ADVARSELEN KAN FØRE TIL AT SERVICELEVERANDØREN, OPERATØREN ELLER PASIENTEN SKADES PÅ GRUNN AV ELEKTRISK STØT, MEKANISKE ELLER ANDRE FARER.

OSTRZEŻENIE

(PL)

- NINIEJSZY PODRĘCZNIK SERWISOWY DOSTĘPNY JEST JEDYNIE W JĘZYKU ANGIELSKIM.
- JEŚLI DOSTAWCA USŁUG KLIENTA WYMAGA JĘZYKA INNEGO NIŻ ANGIELSKI, ZAPEWNIENIE USŁUGI TŁUMACZENIA JEST OBOWIĄZKIEM KLIENTA.
- NIE PRÓBOWAĆ SERWISOWAĆ WYPOSAŻENIA BEZ ZAPOZNANIA SIĘ I ZROZUMIENIA NINIEJSZEGO PODRĘCZNIKA SERWISOWEGO.
- NIEZASTOSOWANIE SIĘ DO TEGO OSTRZEŻENIA MOŻE SPOWODOWAĆ URAZY DOSTAWCY USŁUG, OPERATORA LUB PACJENTA W WYNIKU PORAŻENIA ELEKTRYCZNEGO, ZAGROŻENIA MECHANICZNEGO BĄDŹ INNEGO.

ATENÇÃO

(PT-BR)

- ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.
- SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.
- NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA
- O NÃO CUMPRIMENTO DESTE AVISO PODE POR EM PERIGO A SEGURANÇA DO TÉCNICO, OPERADOR OU PACIENTE DEVIDO A CHOQUES ELÉTRICOS, MECÂNICOS OU OUTROS.

ATENÇÃO

(PT-PT)

- ESTE MANUAL DE ASSISTÊNCIA TÉCNICA SÓ SE ENCONTRA DISPONÍVEL EM INGLÊS.
- SE QUALQUER OUTRO SERVIÇO DE ASSISTÊNCIA TÉCNICA, QUE NÃO A GEMS, SOLICITAR ESTES MANUAIS NOUTRO IDIOMA, É DA RESPONSABILIDADE DO CLIENTE FORNECER OS SERVIÇOS DE TRADUÇÃO.
- NÃO TENTE REPARAR O EQUIPAMENTO SEM TER CONSULTADO E COMPREENDIDO ESTE MANUAL DE ASSISTÊNCIA TÉCNICA
- O NÃO CUMPRIMENTO DESTE AVISO PODE COLOCAR EM PERIGO A SEGURANÇA DO TÉCNICO, DO OPERADOR OU DO PACIENTE DEVIDO A CHOQUES ELÉCTRICOS, MECÂNICOS OU OUTROS.

ATENȚIE

(RO)

- ACEST MANUAL DE SERVICE ESTE DISPONIBIL NUMAI ÎN LIMBA ENGLEZĂ.
- DACĂ UN FURNIZOR DE SERVICII PENTRU CLIENȚI NECESITĂ O ALTĂ LIMBĂ DECÂT CEA ENGLEZĂ, ESTE DE DATORIA CLIENTULUI SĂ FURNIZEZE O TRADUCERE.
- NU ÎNCERCAȚI SĂ REPARAȚI ECHIPAMENTUL DECÂT ULTERIOR CONSULTĂRII ŞI ÎNȚELEGERII ACESTUI MANUAL DE SERVICE.
- IGNORAREA ACESTUI AVERTISMENT AR PUTEA DUCE LA RĂNIREA DEPANATORULUI, OPERATORULUI SAU PACIENTULUI ÎN URMA PERICOLELOR DE ELECTROCUTARE, MECANICE SAU DE ALTĂ NATURĂ.

ОСТОРОЖНО!
(RU)

- ДАННОЕ РУКОВОДСТВО ПО ОБСЛУЖИВАНИЮ ПРЕДЛАГАЕТСЯ ТОЛЬКО НА АНГЛИЙСКОМ ЯЗЫКЕ.
- ЕСЛИ СЕРВИСНОМУ ПЕРСОНАЛУ КЛИЕНТА НЕОБХОДИМО РУКОВОДСТВО НЕ НА АНГЛИЙСКОМ, А НА КАКОМ-ТО ДРУГОМ ЯЗЫКЕ, КЛИЕНТУ СЛЕДУЕТ САМОСТОЯТЕЛЬНО ОБЕСПЕЧИТЬ ПЕРЕВОД.
- ПЕРЕД ОБСЛУЖИВАНИЕМ ОБОРУДОВАНИЯ ОБЯЗАТЕЛЬНО ОБРАТИТЕСЬ К ДАННОМУ РУКОВОДСТВУ И ПОЙМИТЕ ИЗЛОЖЕННЫЕ В НЕМ СВЕДЕНИЯ.
- НЕСОБЛЮДЕНИЕ ТРЕБОВАНИЙ ДАННОГО ПРЕДУПРЕЖДЕНИЯ МОЖЕТ ПРИВЕСТИ К ТОМУ, ЧТО СПЕЦИАЛИСТ ПО ОБСЛУЖИВАНИЮ, ОПЕРАТОР ИЛИ ПАЦИЕНТ ПОЛУЧАТ УДАР ЭЛЕКТРИЧЕСКИМ ТОКОМ, МЕХАНИЧЕСКУЮ ТРАВМУ ИЛИ ДРУГОЕ ПОВРЕЖДЕНИЕ.

UPOZORENJE
(SR)

- OVO SERVISNO UPUTSTVO JE DOSTUPNO SAMO NA ENGLESKOM JEZIKU.
- AKO KLIJENTOV SERVISER ZAHTEVA NEKI DRUGI JEZIK, KLIJENT JE DUŽAN DA OBEZBEDI PREVODILAČKE USLUGE.
- NE POKUŠAVAJTE DA OPRAVITE UREĐAJ AKO NISTE PROČITALI I RAZUMELI OVO SERVISNO UPUTSTVO.
- ZANEMARIVANJE OVOG UPOZORENJA MOŽE DOVESTI DO POVREĐIVANJA SERVISERA, RUKOVAOCA ILI PACIJENTA USLED STRUJNOG UDARA ILI MEHANIČKIH I DRUGIH OPASNOSTI.

UPOZORNENIE
(SK)

- TENTO NÁVOD NA OBSLUHU JE K DISPOZÍCII LEN V ANGLIČTINE.
- AK ZÁKAZNÍKOV POSKYTOVATEĽ SLUŽIEB VYŽADUJE INÝ JAZYK AKO ANGLIČTINU, POSKYTNUTIE PREKLADATEĽSKÝCH SLUŽIEB JE ZODPOVEDNOSŤOU ZÁKAZNÍKA.
- NEPOKÚŠAJTE SA O OBSLUHU ZARIADENIA SKÔR, AKO SI NEPREČÍTATE NÁVOD NA OBLUHU A NEPOROZUMIETE MU.
- ZANEDBANIE TOHTO UPOZORNENIA MÔŽE VYÚSTIŤ DO ZRANENIA POSKYTOVATEĽA SLUŽIEB, OBSLUHUJÚCEJ OSOBY ALEBO PACIENTA ELEKTRICKÝM PRÚDOM, DO MECHANICKÉHO ALEBO INÉHO NEBEZPEČENSTVA.

ATENCION

(ES)

- ESTE MANUAL DE SERVICIO SOLO EXISTE EN INGLES.
- SI ALGUN PROVEEDOR DE SERVICIOS AJENO A GEMS SOLICITA UN IDIOMA QUE NO SEA EL INGLES, ES RESPONSABILIDAD DEL CLIENTE OFRECER UN SERVICIO DE TRADUCCION
- NO SE DEBERA DAR SERVICIO TECNICO AL EQUIPO, SIN HABER CONSULTADO Y COMPRENDIDO ESTE MANUAL DE SERVICIO
- LA NO OBSERVANCIA DEL PRESENTE AVISO PUEDE DAR LUGAR A QUE EL PROVEEDOR DE SERVICIOS, EL OPERADOR O EL PACIENTE SUFRAN LESIONES PROVOCADAS POR CAUSAS ELÉCTRICAS, MECÁNICAS O DE OTRA NATURALEZA.

VARNING

(SV)

- DEN HÄR SERVICEHANDBOKEN FINNS BARA TILLGÄNGLIG PÅ ENGELSKA.
- OM EN KUNDS SERVICETEKNIKER HAR BEHOV AV ETT ANNAT SPRÅK ÄN ENGELSKA ANSVARAR KUNDEN FÖR ATT TILLHANDAHÅLLA ÖVERSÄTTNINGSTJÄNSTER.
- FÖRSÖK INTE UTFÖRA SERVICE PÅ UTRUSTNINGEN OM DU INTE HAR LÄST OCH FÖRSTÅR DEN HÄR SERVICEHANDBOKEN.
- OM DU INTE TAR HÄNSYN TILL DEN HÄR VARNINGEN KAN DET RESULTERA I SKADOR PÅ SERVICETEKNIKERN, OPERATÖREN ELLER PATIENTEN TILL FÖLJD AV ELEKTRISKA STÖTAR, MEKANISKA FAROR ELLER ANDRA FAROR.

DİKKAT

(TR)

- BU SERVİS KILAVUZUNUN SADECE İNGİLİZCESİ MEVCUTTUR.
- EĞER MÜŞTERİ TEKNİSYENİ BU KILAVUZU İNGİLİZCE DIŞINDA BİR BAŞKA LİSANDAN TALEP EDERSE, BUNU TERCÜME ETTİRMEK MÜŞTERİYE DÜŞER.
- SERVİS KILAVUZUNU OKUYUP ANLAMADAN EKİPMANLARA MÜDAHALE ETMEYİNİZ.
- BU UYARIYA UYULMAMASI, ELEKTRİK, MEKANİK VEYA DİĞER TEHLİKELERDEN DOLAYI TEKNİSYEN, OPERATÖR VEYA HASTANIN YARALANMASINA YOL AÇABİLİR.

REVISION HISTORY

REVISION	DATE OF ISSUE	REASON FOR CHANGE
0	8, 24, 2000	FIRST RELEASE
1	9, 25, 2000	• Add table lubricant boxes replacement procedure. • Add new table control board schematics and table control board adjusting procedure. • Update System Schematics and Tomo-link Schematics. • Supplement tomo (option) installation procedure. • Add collimator bulb replacement procedure. • Modify touch screen calibration procedure. • Update FRU parts list.
2	11,10,2000	• Update page i, 4-6, 4-7, 10-12 and 10-14
3	11,20,2000	• Add collimator mounting screws' torque requirement. Chapter 2. • Update renewal parts list and illustration. Chapter 9. • Add collimator bulb replacement notes. Chapter 3. • Update Schematics page numbers. Chapter 10. • Add a note on removing vinyl protective films. Chapter 2. • Add a note on ESC key in Service Software. Chapter 3. • Add a trolley stud picture. Chapter 2. • Add a torque requirement to Trunion screws. Chapter 2. • Add a Trunion installation warning. Chapter 2.
4	02,05,2001	• Update renewal parts list. Chapter 9 • Update system console mounting Job Card. Chapter 2. • Add printer mounting Job Card. Chapter 2. • Add system console replacement Job Card. Chapter 3. • Add notes. Chapter 2, 3, 4, 8. • Add OTS console schematics. Chapter 10. • Add DOSE Calibration Job Card. Chapter 4. • Add collimator alignment Job Card. Chapter 4. • Add printer cables connection. Chapter 2. • Add collimator update Job Card. Chapter 3. • Add a maintenance item about 'LAT bar'. Chapter 8.
5	09,28,2001	• Update room dimension in Chapter 2 • Add collimator D1&D2 trouble shooting and replacement in Chapter 3 • Transfer the Job Card SW JEDI 7-4,7-3,7-2 from Chapter 3 to Chapter 4 • Update touch screen calibration and AEC calibration in Chapter4 • Add new error code in chapter 7 • Add new Job Card PM010 in Chapter 8 • Update renewal parts list in Chapter 9 • Add schematics in Chapter 10
6	11,16,2001	• Update collimator mounting procedure in Chapter 2 • Update PM010 in Chapter 8
7	06,21,2002	• Update renewal parts in Chapter 9 • Update 90WS SW installation in Chapter 4,Grip adjust/EMC in Chapter2
8	11,03,2002	• Update renewal parts in Chapter 9

		• Update Job Card for Table motor replacement in Chapter 3
9	07,25,2003	• Update renewal parts in Chapter 9 • Add Job Card IST 008, 012, 014, 016 for SG100 Wall Stand and MX100 X-ray tube assembling in Chapter 2 • Add Job Card IST 033 for Spanish language labels in Chapter 2 • Update Job Card CAL 002, 006, 007, 008, 010, SW JEDI 7-4,7-2, IST JEDI 5-2 in Chapter 4 • Add Functional Check contents for SG100 Wall Stand in Chapter 5 • Add Collimator error codes in Chapter 7 • Add Planned Maintenance contents for SG100 Wall Stand in Chapter 8 • Update schematics in Chapter 10
10	07,28,2003	• Recover the contents for RAD21 tube
11	09,15,2003	• Change the database file name for MX100 tube
12	04,09,2004	• Update renewal parts in Chapter 9 • Update Job Card IST 16 in Chapter 2 • Update Job Card CAL 2 in Chapter 4
13	10, 29, 2004	• Update regulatory requirements • Add Job Card IST 009, 016, 017 for SG120 Wall Stand and Eclipse Proteus Collimator in Chapter 2 • Update IST 020, 021, 022, 023, 025, 033 for SG120 Wall Stand and Eclipse Proteus Collimator in Chapter 2 • Update Job Card 006, 008, SW JEDI 7-2 in Chapter 4 • Add SG120 Wall Stand in Chapter 5 • Add Eclipse Proteus Collimator error codes in Chapter 7 • Add SG120 Wall Stand Planned Maintenance in Chapter 8 • Update renewal parts in Chapter 9 • Add SG120 Wall Stand Schematics in Chapter 10
14	07, 25, 2005	• Update Proteus System Console Software to V2.14 • Update IST 002 in Chapter 2 • Add notes in Chapter 2 • Add Caution in Chapter 3 • Update CAL 002 in Chapter 4 • Update Eclipse Proteus Collimator Error Codes in Chapter 7 • Update PM 004 in Chapter 8 • Update renewal parts in Chapter 9 • Update Table Schematic 221-3000 in Chapter 10
15	12.12,2005	• Add requirements of warning label in Chapter 2 • Add rotation limit screw in Chapter 2 • Delete a picture and add a section in section 5-3-3 • Change a warning and a picture of cable connection, add a note in Chapter 2 • Add the content in Chapter 2 • Add 2 notes in Chapter 2 • Add a Job Card in Chapter 4 • Add a note and a tool in Chapter 8 • Change part No. in Chapter 9

		• Change 2 picture in Chapter 9
16	02.15,2006	• Add description of GEHL Reciprocating Bucky and AID Ion Chamber in Chapter 2 and Chapter 9
17	06.20, 2006	• Update warning label to meet HHS requirements in Chapter 2.
18	10.10, 2006	• Add LOTO contents in Chapter 1 • Add Notes and Warnings in IST 011 in Chapter 2 • Update Warning and add bucky jumpers pictures in IST 009 in Chapter 2 • Update motor replacement in Chapter 3 • Add Warning in system console replacement in Chapter 3 • Add Warning in Chapter 5 • Add bearing and shaft check procedures In PM004 in Chapter 8 • Update PDU Schematics in Chapter 10
19	12.15,2006	• Add Note in IST 015 in Chapter 2 • Update IST 016 in Chapter 2 • Update IST 017 in Chapter 2 • Add Note in Replace whole collimator in Chapter 3 • Update Replace collimator lamp assembly in Chapter 3 • Update Eclipse Proteus Collimator error codes in Chapter 7 • Update GPCP NO. and Description of OTS in Chapter 9
20	06.05.2007	• Introduce in new endcaps in Chapter 2 and Chapter 9 • Update language information
21	02.20.2008	• Update safety door and door light connector information in Chapter 2 • Add Korean rating plate descriptions in Chapter 2 • Update software version information in Chapter 3 • Add VA site software descriptions in Chapter 4 • Update renewal parts in Chapter 9 • Update table related contents with 560 mm detent in Chapter 4, 5, 7, 9, 10
22	07.25.2008	• Update Language Statement in page ix~xvi • Add Cone Retainer during Mount Proteus XR/a Collimator to MX100 X-ray Tube in Chapter 2 • Add Note in Chapter 2 • Update the IST019 in Chapter 2 • Add clean foot pedal in PM • Update item 73 in page 9-2
23	08.05.2009	• Page 4-11 Update table min height from 500mm to 550mm. • Page 4-11 item 3, update 550mm-810mm. • Page 4-12 update item 3. • Page 4-14 update item 9. • Page 5-3 update the picture. • Page 5-4 update description of section 4-1-3 and Illustration 5-2 of table height. • Page 8-1 update the information of clear foot pedal and the information of Transversal rods and bearings • Page 8-7 item 1 (a & b), update with double click and depressed. • Page 9-1 update item 22 part number to 5336380. • Page 9-2~3 update FRU list.

		• Replace part number 2260354 by 600-0301. • Page 9-14 add inhibition button warning label picture item 83. • Page 9-6 add Bucky FRU list.

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CHAPTER 1 BEFORE YOU START

SECTION 1 INTRODUCTION

The goal of this document is to guide the service representative through an entire X-ray room installation.
The following On-site Requirements must be accounted for prior to beginning installation of the system.

SECTION 2 OBJECTIVE AND SCOPE OF THIS MANUAL

This direction will lead you in a correct sequence through the manuals needed to install the equipment. Following the suggested sequence will result in an orderly installation. However, extenuating circumstances may dictate a deviation from the recommended sequence. Feel free to deviate, but keep track of your progress by checking off the tasks in the flowchart as you complete them.

Check equipment according to the packing list (Product Delivery Instructing) for your system against the main catalog numbers in the “System Listing Chart.” Also, verify that all manuals are present in the binders according to the Table of Contents.

All interconnection cables are furnished in variable, preselected lengths from the “Cable Data Packet.” Before starting to install your system, identify all the cables and check their length to verify that they are long enough. If you find a short cable, contact us immediately so we can send the required length cable to you and thereby, not delay the installation.

2-1 Installation Plan

The main steps in the installation plan are easily seen by looking at the Table of Contents for this document. The plan objectives are to:

1. Give a logical installation order which recognizes mechanical and electrical interface areas
2. Test and adjust each subsystem independently.

To obtain a good overall view of how these objectives are to be achieved review the Table of Contents for this document before beginning the installation work. Then, if it is necessary to deviate from the stated plan, you will be aware of the essential interface areas. This will give you the information required to make another effective plan which applies to our particular situation.

2-2 Interconnection

Interconnection of products by furnished cables or contractor supplied wiring is indicated by numbered MIS runs in the installation sections. Run interconnect charts are available which describe the connection and function of each wire.

For Proteus XR/a system, refer to the following:
- Proteus XR/a system Cable Maps (Chapter 10)

2-3 Presentation

The procedures in this steering manual are presented in job card form.

SECTION 3 ON-SITE REQUIREMENTS

3-1 Tools and Test Equipment

There are additional tools and test equipment besides the standard service representative tool kit which must be available before installing the Proteus XR/a System. Refer to each subsystem service manual for details.

3-2 Documentation

Directions are necessary for correct installation of the Proteus XR/a system. Procedures from each document will be used and reflect the latest information available at this time.

Not all procedures in this manual apply to all sites. Before you begin installation, cross out the procedures that do not apply to your site.

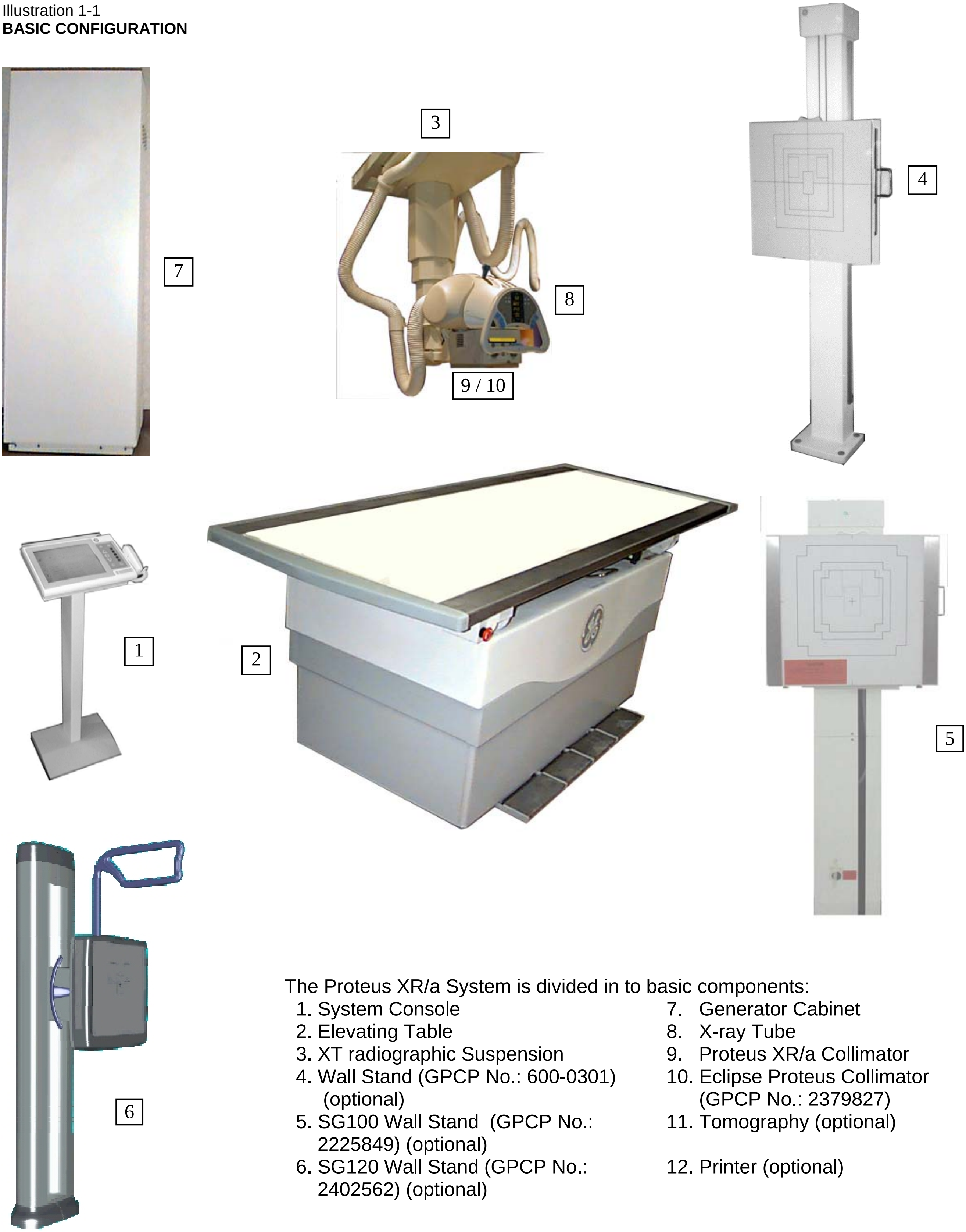
3-3 MIS Maps

The proper system cable interconnect map is necessary for correct installation of a Proteus XR/a system. Refer to:

- Proteus XR/a system MIS Maps (Chapter 10)

SECTION 4   DESCRIPTION OF SYSTEM

Illustration 1-1
BASIC CONFIGURATION



The Proteus XR/a System is divided in to basic components:

1. System Console
2. Elevating Table
3. XT radiographic Suspension
4. Wall Stand (GPCP No.: 600-0301) (optional)
5. SG100 Wall Stand (GPCP No.: 2225849) (optional)
6. SG120 Wall Stand (GPCP No.: 2402562) (optional)
7. Generator Cabinet
8. X-ray Tube
9. Proteus XR/a Collimator
10. Eclipse Proteus Collimator (GPCP No.: 2379827)
11. Tomography (optional)
12. Printer (optional)

SECTION 5 LOCK-OUT & TAG-OUT (LOTO)

3-1 System Power

Name Of Equipment: Proteus
Number Of Locks: One per person, working on the system
Title(s) of Employees Authorized to Perform LOTO:
Those trained in Lockout Tagout (LOTO)
Title(s) of Affected Employees and How to Notify:
Hospital Personnel; notified by verbal communication.

Energy Source	Yes	No	Location of Energy Isolating Means	Magnitude of Energy
Electrical	X		System's Main "A1" Power Disconnect	320-480VAC, 3 Phase
Pneumatic		X		
Hydraulic		X		
Gas/Water/Steam		X		
Chemical		X		
Mechanical Motion		X		
Motion		X		
Gravity		X		
Springs		X		
Thermal		X		
Stored Energy		X		
Air Under Pressure		X		
Oil Under Pressure		X		
Water Under Pressure		X		
Gas Under Pressure		X		
Steam		X		
Other		X		

Type(s) of Equipment and/or Method(s) Selected to Dissipate or Isolate Stored Energy:
Allow 3 minutes for stored energy to dissipate.

Type(s) of Equipment and/or Method(s) Used to Ensure Disconnection's:
One Lock & Tag for Main "A1" Disconnect.

3-2 LOTO Procedure for System Power

Name Of Equipment: Proteus

Step	Lockout/Tagout Procedure
1	Prepare for shutdown of equipment by notifying affected personnel working in the area that lockout/tagout is being performed.
2	Bring system software down.
3	Locate main power supply (Service) disconnect feeding System Cabinet.
4	Lock Out / Tag Out the main power disconnect.
5	Using an insulated voltmeter, measure the incoming power connection to the system cabinet at the circuit breaker.
6	If no voltage is present at the system cabinet's circuit breaker; place the power switch on the PDU to the OFF position and service equipment as required.
7	After service has been performed, notify affected personnel that equipment will be reenergized and LOTO devices are being removed.
8	Assure the safety of the area and that all safety devices and guards have been replaced.
9	Return system functions to a preset state.
10	Remove Lock-Out Tag-Out equipment from main disconnect.
11	Locate main power supply (Service) disconnect feeding System Cabinet and re-apply power.

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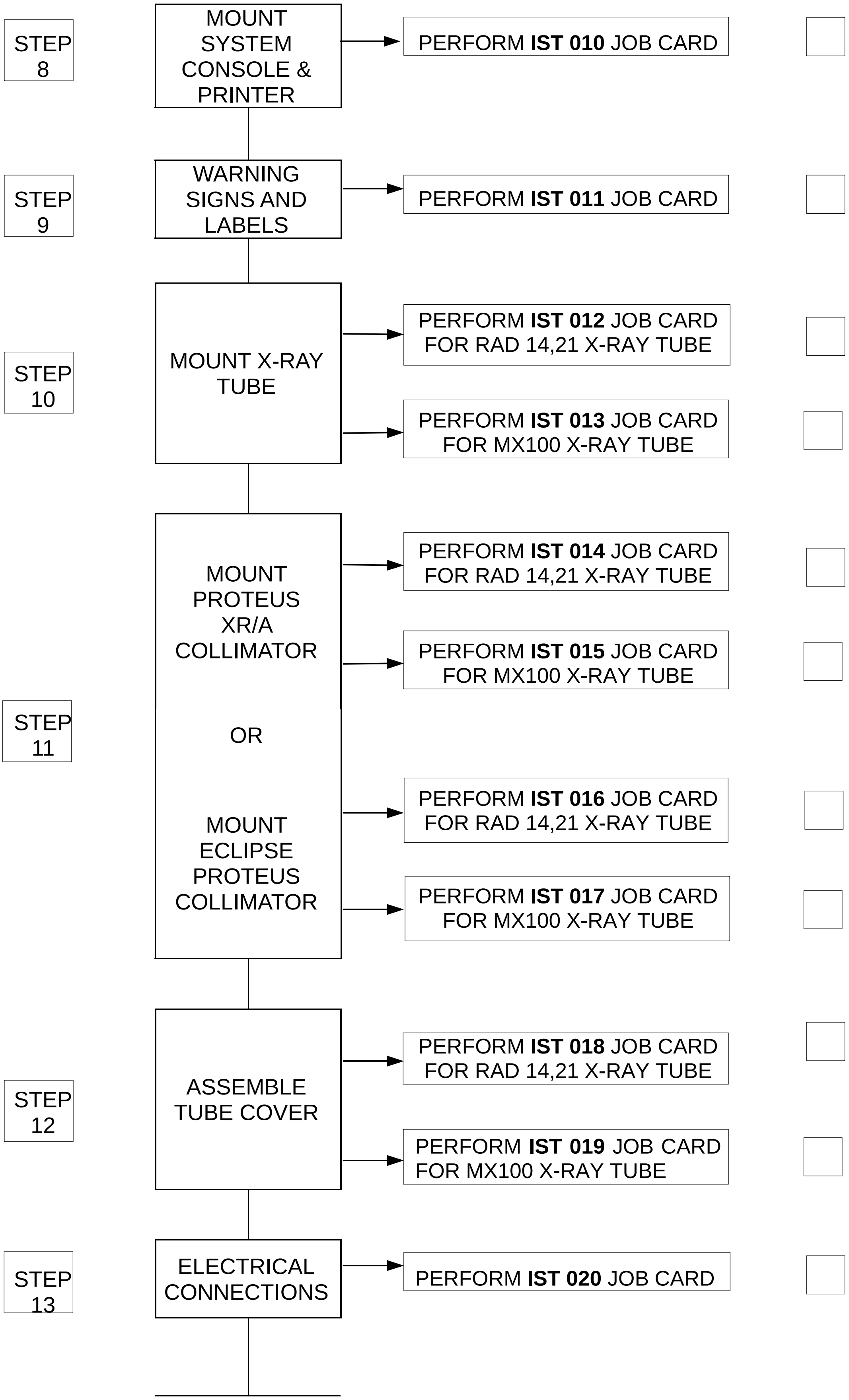
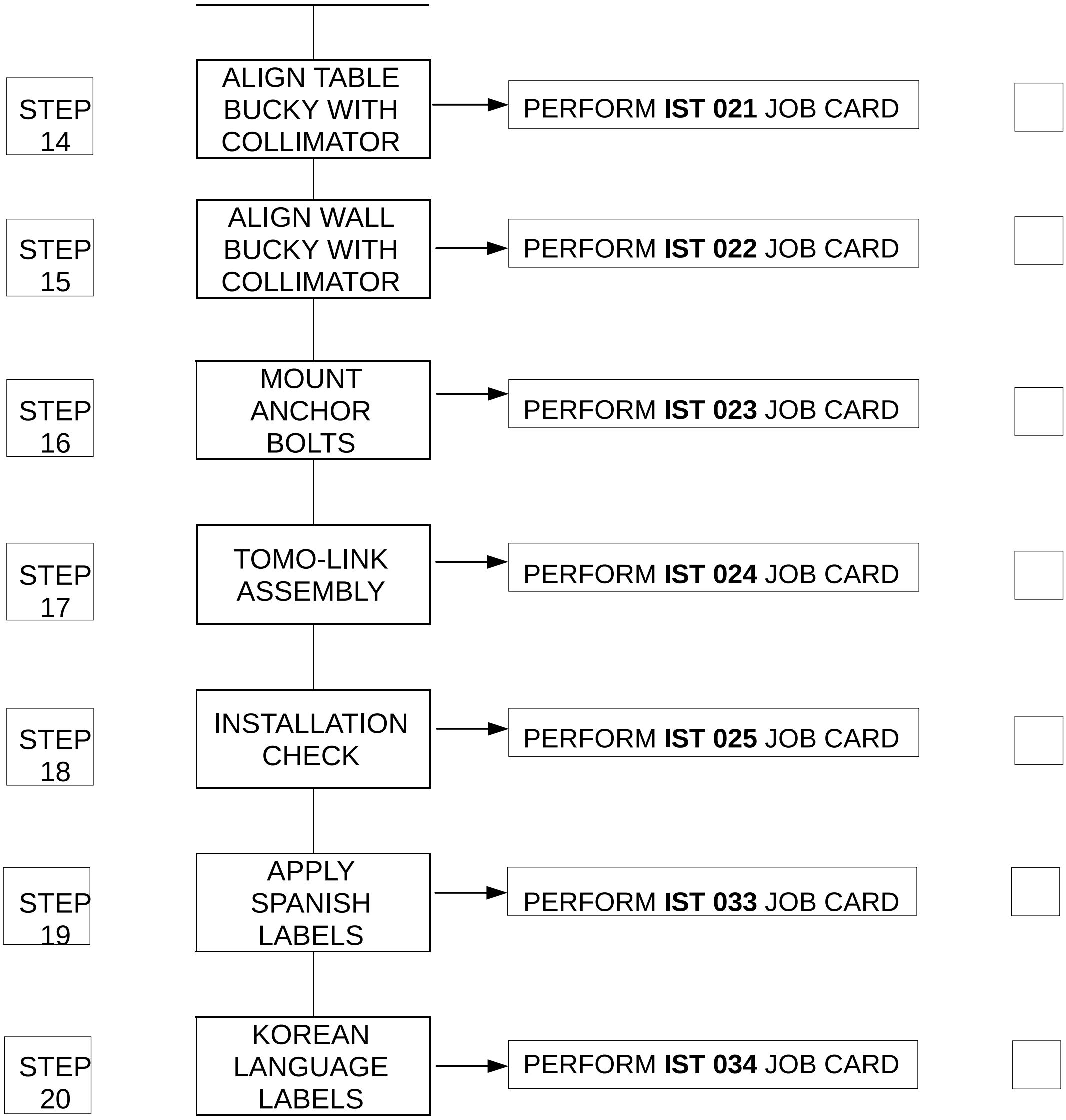
CHAPTER 2 PHYSICAL INSTALLATION

SECTION 1 PHYSICAL INSTALLATION SEQUENCE GUIDE

Each system is installed in the sequence that will insure the safest and most time efficient installation. The installation sequence performed at most sites is as follows:

			DONE
STEP 1	RECEPTION CHECK, UNPACKING	PERFORM **IST 001** JOB CARD	☐
STEP 2	ASSEMBLE OTS CARRIAGE	PERFORM **IST 002** JOB CARD	☐
STEP 3	CONNECT OTS CABLES	PERFORM **IST 003** JOB CARD	☐
STEP 4	POSITIONING THE TABLE	PERFORM **IST 004** JOB CARD	☐
STEP 5	MOUNT GRID	PERFORM **IST 005** JOB CARD	☐
STEP 6	INSTALL TABLE TOP AND ENDCAP	PERFORM **IST 006** JOB CARD	☐
STEP 7	INSTALL WALL STAND	PERFORM **IST 007** JOB CARD FOR WALL STAND (GPCP No. 600-0301)(optional);	☐
		PERFORM **IST 008** JOBCARD FOR SG 100 WALL STAND (GPCP No. 2225849)(optional);	☐
		PERFORM **IST 009** JOBCARD FOR SG120 WALL STAND (GPCP No. 2402562)(optional).	☐


STEP 8
MOUNT SYSTEM CONSOLE & PRINTER
PERFORM IST 010 JOB CARD
☐
STEP 9
WARNING SIGNS AND LABELS
PERFORM IST 011 JOB CARD
☐
STEP 10
MOUNT X-RAY TUBE
PERFORM IST 012 JOB CARD FOR RAD 14,21 X-RAY TUBE
☐
PERFORM IST 013 JOB CARD FOR MX100 X-RAY TUBE
☐
STEP 11
MOUNT PROTEUS XR/A COLLIMATOR
PERFORM IST 014 JOB CARD FOR RAD 14,21 X-RAY TUBE
☐
PERFORM IST 015 JOB CARD FOR MX100 X-RAY TUBE
☐
OR
MOUNT ECLIPSE PROTEUS COLLIMATOR
PERFORM IST 016 JOB CARD FOR RAD 14,21 X-RAY TUBE
☐
PERFORM IST 017 JOB CARD FOR MX100 X-RAY TUBE
☐
STEP 12
ASSEMBLE TUBE COVER
PERFORM IST 018 JOB CARD FOR RAD 14,21 X-RAY TUBE
☐
PERFORM IST 019 JOB CARD FOR MX100 X-RAY TUBE
☐
STEP 13
ELECTRICAL CONNECTIONS
PERFORM IST 020 JOB CARD
☐



STEP 14	ALIGN TABLE BUCKY WITH COLLIMATOR	PERFORM **IST 021** JOB CARD	☐
STEP 15	ALIGN WALL BUCKY WITH COLLIMATOR	PERFORM **IST 022** JOB CARD	☐
STEP 16	MOUNT ANCHOR BOLTS	PERFORM **IST 023** JOB CARD	☐
STEP 17	TOMO-LINK ASSEMBLY	PERFORM **IST 024** JOB CARD	☐
STEP 18	INSTALLATION CHECK	PERFORM **IST 025** JOB CARD	☐
STEP 19	APPLY SPANISH LABELS	PERFORM **IST 033** JOB CARD	☐
STEP 20	KOREAN LANGUAGE LABELS	PERFORM **IST 034** JOB CARD	☐

Note: *If your country requires the product rating plate label to be in the language of that country, follow the instructions on document #45474336. Paste the appropriate language label over the English rating plate. The rating plate labels are: 2379361 (Spanish), 2379361-2 (German), 2379361-3 (French), 2379361-4 (Italian).*

Note: *Spanish Label Kit (2382506), Focus Label (46-23972P2), and Console Label (610-3089) are in the OPEN ME FIRST box in Crate #4-6.*

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SECTION 2 INSTALLATION JOB CARDS

PROTEUS XR/A			**1/2**	**IST 001**
Subassembly: **Reception Check, Unpacking**				
Purpose: Prepare for installation			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **2h**	

1. Pre-installation Check

1) Verify all required cable ductwork, conduits, and raceways are installed according to Site Plans. Ensure Customer supplied cables/wires are in place for connection to the system.

   - Ensure that High Voltage and power cables are separated from signal cables as much as possible.
   - Verify that 3-phase power and ground lines can be placed in the same trough or conduit.

2) At this time, the “Sales/Service Pre-installation Checklist,” provided in the applicable planning direction, should be reviewed and signed off by the salesman and the Service Department representative.

   Mark exact positions of components on the floor, wall and/or ceiling.

2. Unpacking

The PROTEUS XR/a system is shipped in four crates to facilitate transport and installation. Crates dimensions and weights are shown in Table 1-1 below.

Crate dimensions & weight

Content	Length mm	Width mm	Height mm	N.W. kg	G.W. kg
Table Top and Base	1065	1100	2410	200	350
Cabinet	1955	690	790	150	200
Wall Stand (GPCP No. 600-0301) (optional)	620	800	2360	100	250
SG100 Wall Stand (GPCP No. 2225849) (optional)	880	840	2280	186	280
SG120 Wall Stand (GPCP No. 2402562) (optional)	940	890	2410	220	300
Accessories	1270	1100	1220	50	120

PROTEUS XR/A	2/2	IST 001

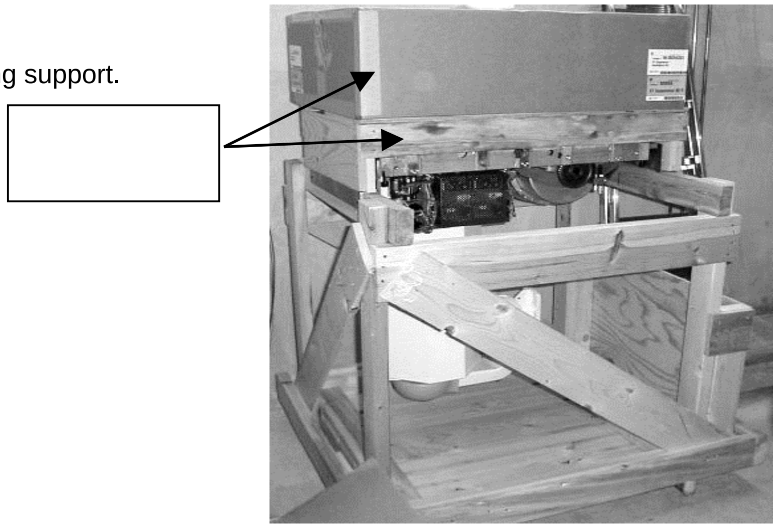
- Do not discard any packing material such as envelopes, boxes, bags until all parts are accounted for against the packing list.
- Check the mechanical condition and external appearance of all parts for possible
- damage or missing items.
- The distribution center or factory must be notified immediately of any damage or shortage of parts.

Note: ***Do not use the capacitors in the Accessories crate #4 for installation. Please pay attention to pick out and dispose the capacitors in the Accessories crate #4. Ensure the eco-friendly disposal of the capacitors.***

PROTEUS XR/A			**1/5**	**IST 002**
Subassembly: **Assemble OTS Carriage**				
Purpose: Installation Procedure			*Version no.* 1 *Date:* **25/07/05**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **4hour**	

1. Install the Stationary Rails according to the procedure outlined in Direction 46-019639, Advantx XT Stationary Rails Installation & Adjustments.

2. Unpacking
   Remove Cardboard box and wood shipping support.

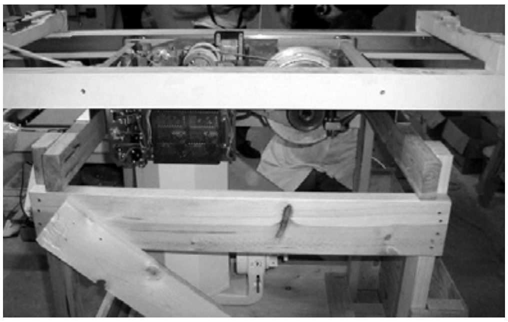


Note: ***If the system is equipped with TOMO link, please insert the two TOMO driver cables (2124056 and 2132261) into the cable drape hose before lifting the OTS bridge into position. Refer to Job card IST 025 on page 3-25.***

3. If the system is equipped with a Siemens Manual Collimator (2259989), replace the existing field light transformer on top of the OTS carriage with the 2143622-2 transformer provided with catalog S3918KP. Re-use the existing mounting hardware. Refer to OTS service manual for transformer location and replacement, Refer to CAL 015 to calibrate lamp voltage.

PROTEUS XR/A	2/5	IST 002

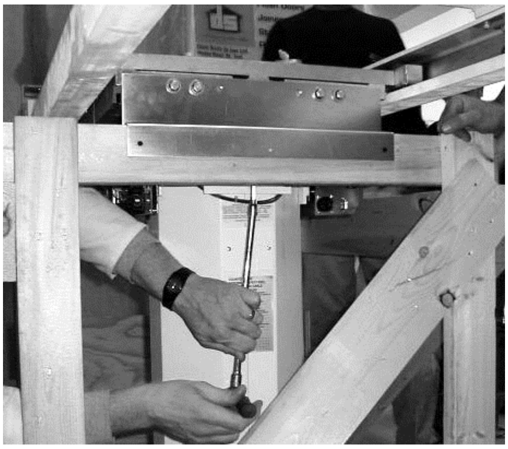
4. Install Overhead Bridge onto Shipping Dolly.



Bolt Bridge Carriage to Overhead Bridge

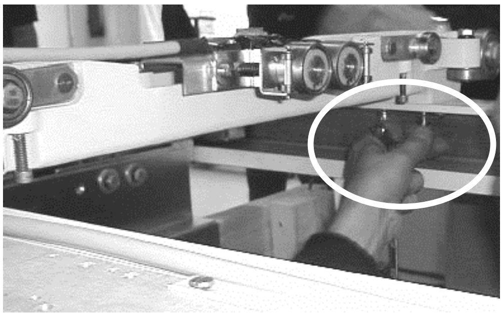
Note: The six bolts must be installed and tightened.

Be extremely careful not to pinch cables between dolly & carriage when tightening bolts.

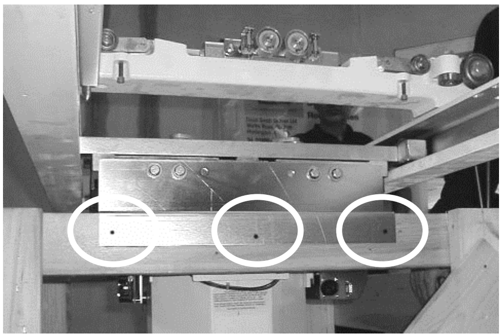


5. Remove the eight bolts from the front crosstie.

   Move the crosstie towards bridge center about 10cm.



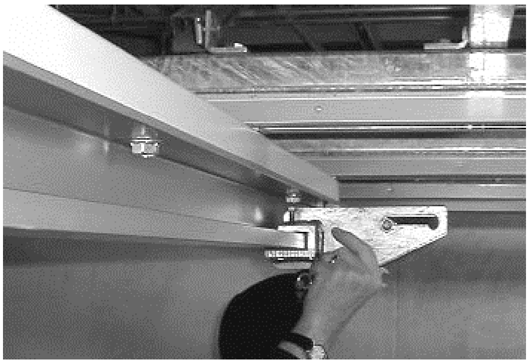
6. Remove the six shipping bolts on both sides of Carriage.



On both sides

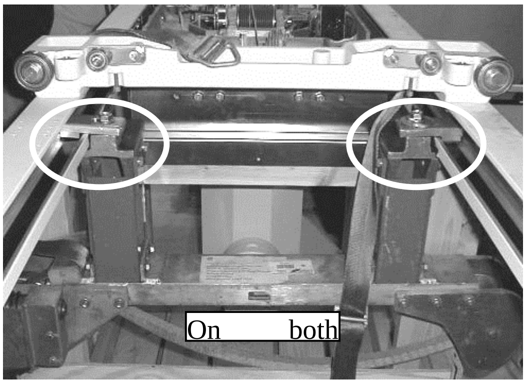
7. Attach OTS Lifting Fixtures A to Overhead Rails

   Fixture position refers to Direction 46-019803 Advantx VHLZ XT Inboard Suspension Installation.

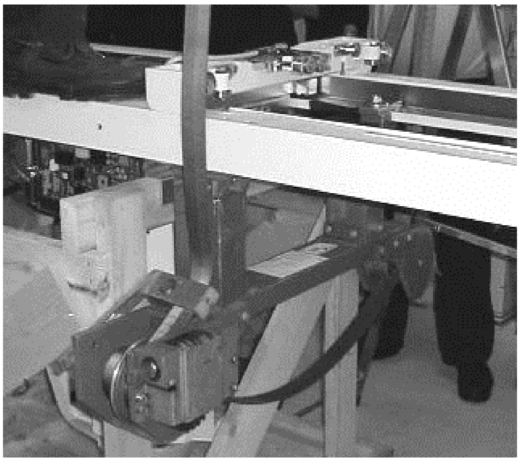


8. Attach OTS Lifting Fixtures B to Overhead Bridge

   Note: ***Make sure the crank handles are both on the same side of the bridge.***

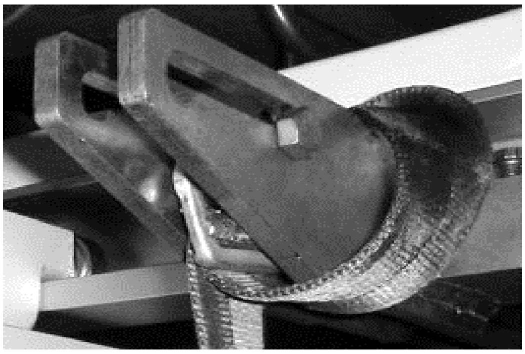


9. Route the straps outside of bridge rail.



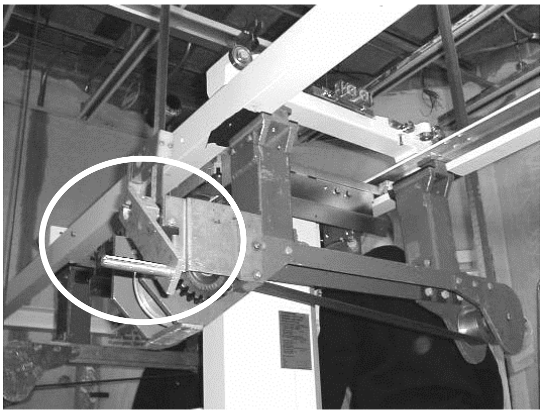
Attach the strap ends to OTS Lifting Fixtures A on Overhead Rails.

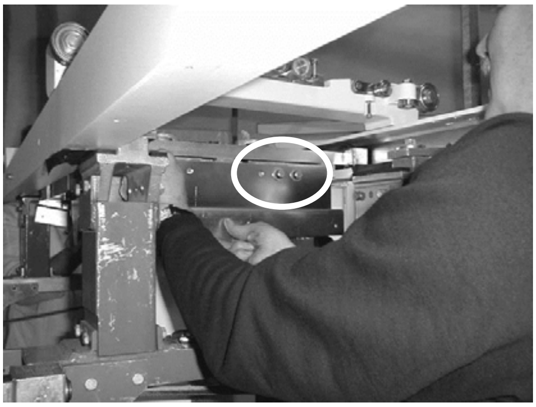
Note: ***The bolts should be fastened.***



PROTEUS XR/A	4/5	IST 002

10. Rotate the two cranks on Lifting Fixtures B on Overhead Bridge evenly to raise the Carriage.





With OTS partially raised, remove 2 metal shipping brackets (both sides of Carriage), 4 bolts each.

11. Remove metal Shipping Brackets.

Note:* *Make sure the crank handles are both on the same side of the bridge.

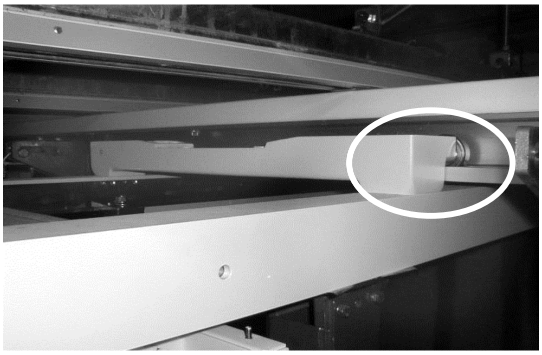
Be extremely careful not to pinch cables between dolly & carriage when tightening bolts.

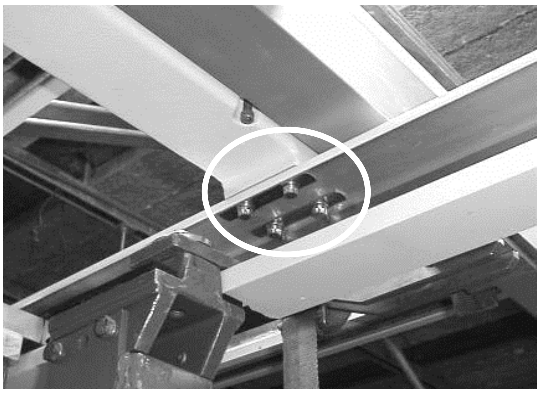
PROTEUS XR/A	5/5	IST 002

12. Bridge Installation

    a) Raise bridge up to stationary rails with cables hanging to the floor. Place bearings of rear crosstie into rear stationary rail.

    Gently move Overhead Bridge until bearings fall into bearing track in Aluminium rail.





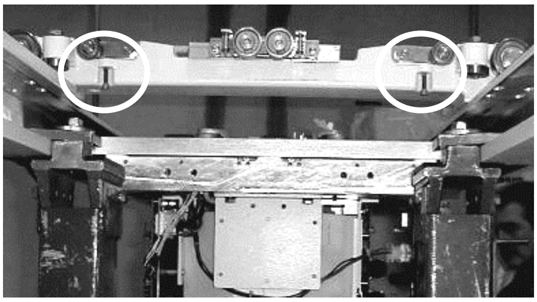
    b) Place the front crosstie into position on bridge and bolt the crosstie to the bridge.

    c) Center front and rear crosstie bearings on wearstrips and tighten eight screws securing front crosstie to bridge.

Note:* *Be sure bearings ride on the center of the wearstrips over the complete range of OTS travel. If bearings travel off center, the stationary rails and crosstie alignment must be checked.

    d) Lower bridge until roller bearings contact wearstrips.

    e) Remove Lifting Fixtures B from the bridge and lower to the ground.



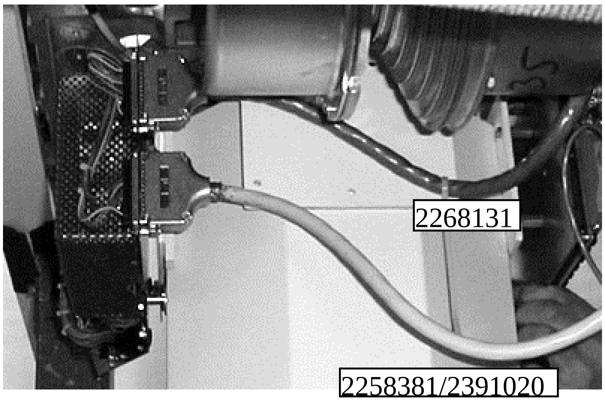
    f) Adjust upper bearings on both crossties for .02 gap to upper part of rails. (Adjustment made with Allen wrench from bottom of crosstie)

    g) Remove Lifting Fixtures A from the stationary rails.

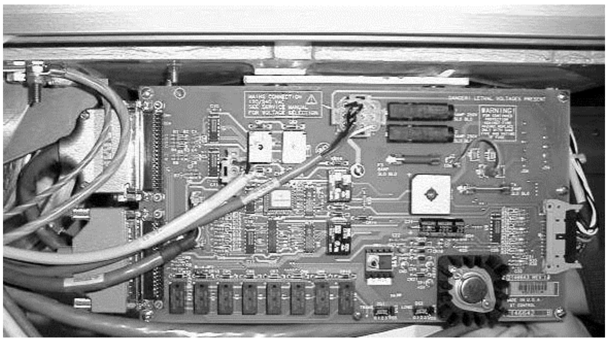
PROTEUS XR/A			**1/1**	**IST 003**
Subassembly: **Connect OTS Cables on Carriage Side**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **10min**	

1. Connect OTS Console locks power cable (2258381;for MX100 tube, apply cable 2391020). Refer to system MIS chart in page 10-1.

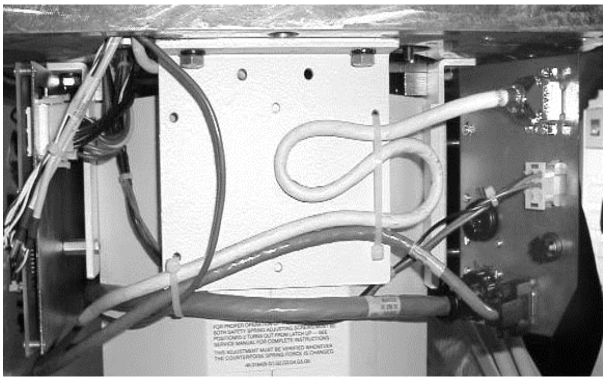
Note: ***The OTS I/F PCB PWR Supply cable (2268131) is factory connected.***



2. Connect cables to OTS control board. (J1, J101, J4, J3, J100, J6). Refer to system MIS chart on page 10-1 and Job card IST 020 in this Chapter.

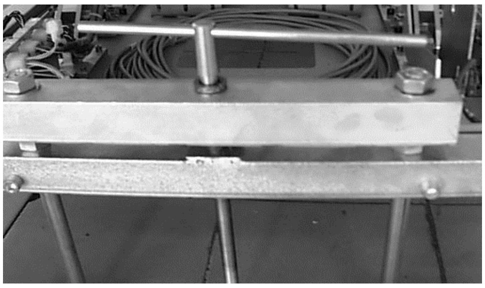


3. Connect Collimator Power & CAN cable (2391024), OTS Console Power & CAN cable (2259867; for MX100 tube, apply cable 2391017), OTS CAN cable (2258389 or 2258389-2), and AC power cables. Refer to system MIS chart on page 10-1 and Job card IST 020 in this Chapter.



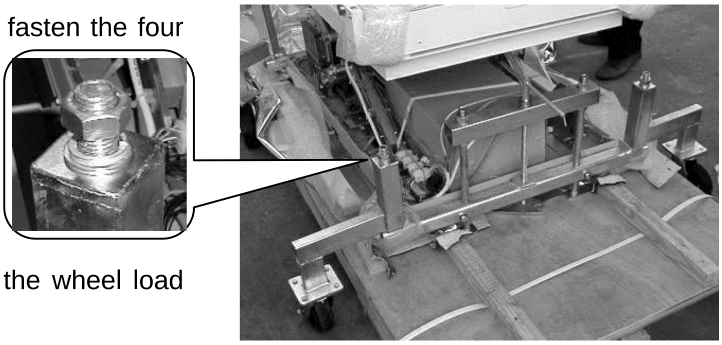
PROTEUS XR/A			**1/2**	**IST 004**
Subassembly: **Positioning the Table**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 4*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

1. Turn the handle clockwise to lift table base.



2. Mount the trolley wheels on the bracket and fasten the four screws.

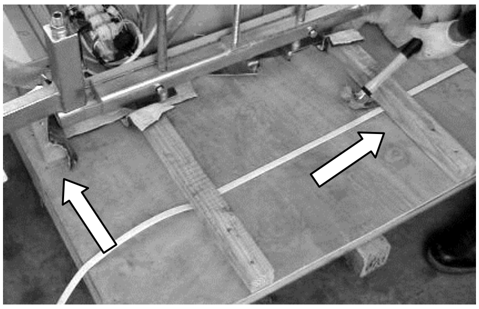
Note: ***The trolley wheels are in box 1-7.***



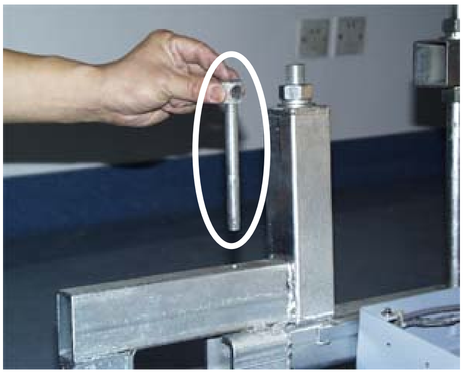
3. Turn the handle counter-clockwise to make the wheel load the table weight.

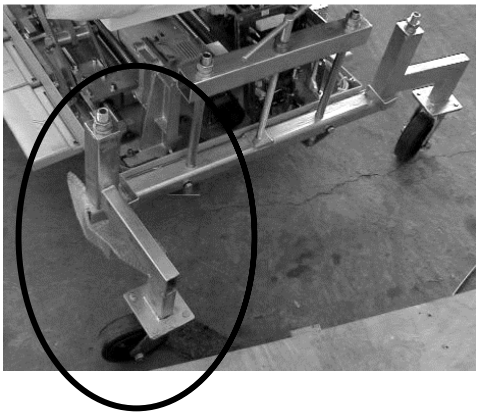
4. Take off the wood stoppers. Then take out the shipping base.

5. Rotate the four trolleys wheels to parallel position with table longitudinal axis.

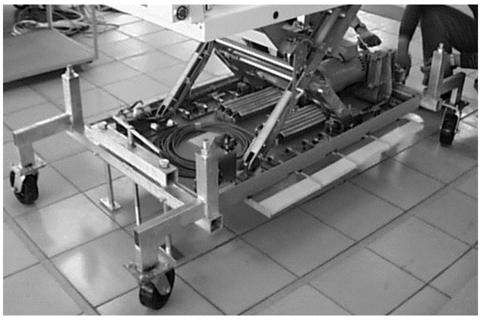


CAUTION **Don’t put your feet under the table base. The table is very heavy and may hurt you.**





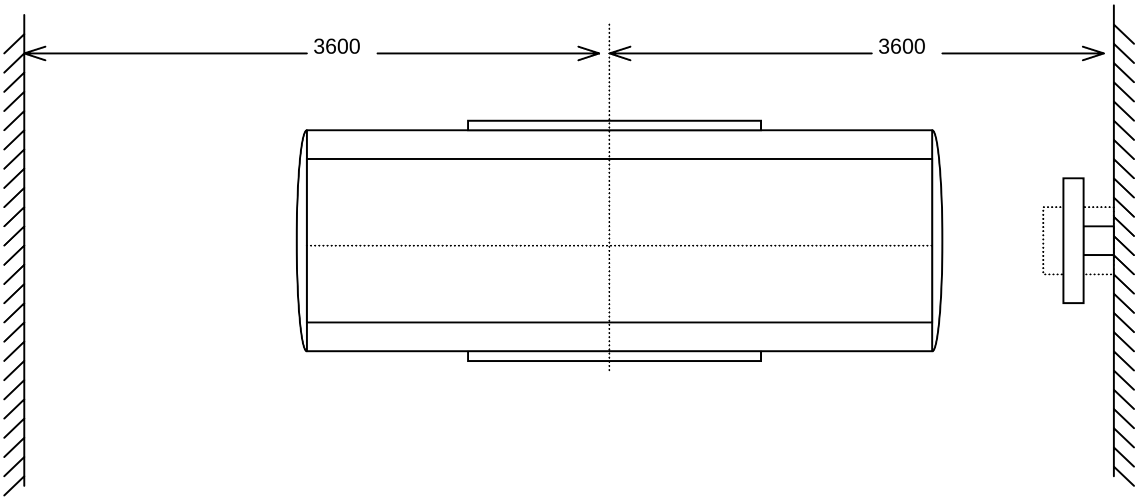
PROTEUS XR/A	2/2	IST 004



6. Position the table as close as possible to the center of the collimator light field.

Note: ***When positioning the table base, ensure that the minimum clearance on either side of the table from the table base center to the wall is 3600mm:***

If the room dimension is smaller than the specified size, mount the table top before positioning the table.



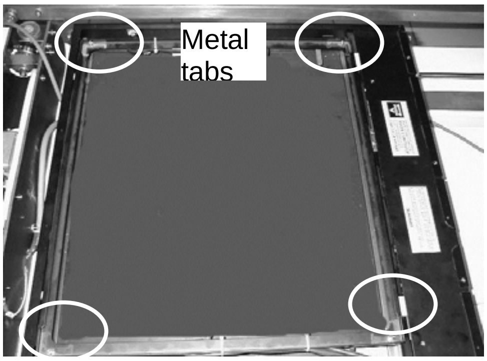
7. Repeat procedure (1).

8. Remove the trolleys.

9. Turn the handle counter-clockwise and put the table base on the ground, then disassembly the trolley bracket.

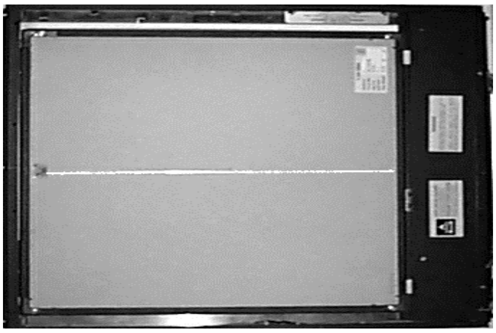
PROTEUS XR/A			**1/1**	**IST 005**
Subassembly: **Mount Grid**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **10 min**	

1. Remove right side two metal tabs and keep left side metal tabs loose enough.



2. Position the Ion grid evenly under the tabs.

3. Reinstall the removed tabs and fasten four screws.

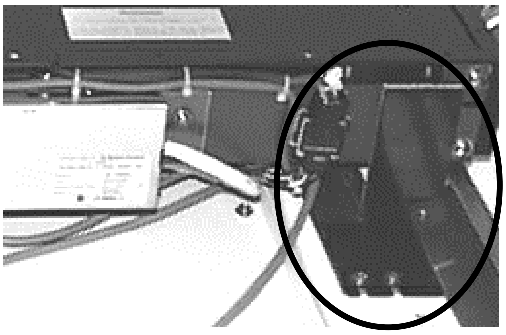


4. Remove the shipping bracket.

5. Put the screws back on braking plate.

Note: These two screws are used to fasten braking plate also. Must to be screwed.

6. Reinstall the table top.



PROTEUS XR/A			**1/4**	**IST 006**
Subassembly: **Install Table Top**				
Purpose: Installation Procedure			*Version no.* 1 *Date:* **05/06/07**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To* / /	*From* *To*	*Time:* **30min**	

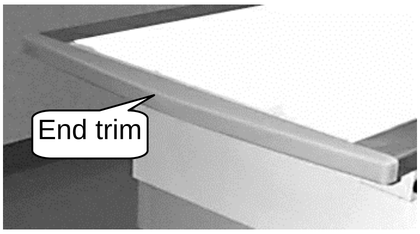
Table Top and Endcaps Assembly/Installation

The following procedures describe how to install the table top and endcaps on the table in those cases where removal is required.

Table Top Installation

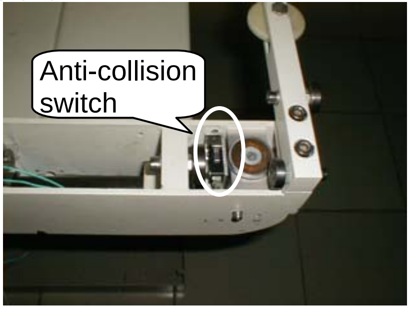
The table top is installed as follows:

1. Remove the end trim piece from one side of the table top assembly. This consists of removing the two pan head screws, which sit in the counter bores on the face of the trim piece.



2. Slide the table top assembly onto the bearing assemblies from one end.

Note: ***Pay attention to the anti-collision switches. Table top frame may collide with the switch.***



3. Re-attach the trim to the table top assembly.

To obtain the smoothest and most quiet ride of the table top, adjustments may be made if necessary to the table top bearings. These adjustments are made to precise specifications at the factory prior to shipping, but shipping and handling may make minor “fine tuning” adjustments necessary after the table is assembled.

Note: ***Ensure that there is no lubricant, dust or other feculence on the slide rod.***

PROTEUS XR/A TABLE TOP	2/4	IST 006

Table Top Adjustments

Note: Before adjusting, remove table top, then turn the table top around to opposite side. If the table top still does not ride smoothly, proceed as follows:

While viewing the underside of the table top, move the table top back and forth. Check the bearings that ride horizontally (eccentric bearings) for looseness or tightness. If eccentric bearings are loose, adjust eccentric bearings out. If bearing is too tight, adjust eccentric bearings in.

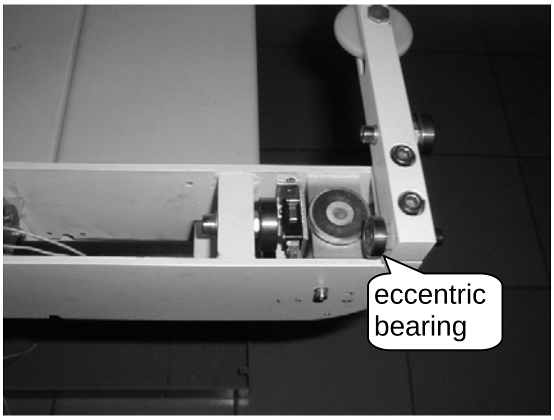
Adjusting Eccentric Bearings Out

1. Remove end trim bracket.
2. Slide rail until eccentric bearing is visible.
3. Adjust eccentric bearing out using T-handle Allen wrench.

Adjusting Eccentric Bearings In

1. Remove end trim bracket.
2. Slide rail until eccentric bearing is visible.
3. Adjust eccentric bearing in using T-handle Allen wrench.

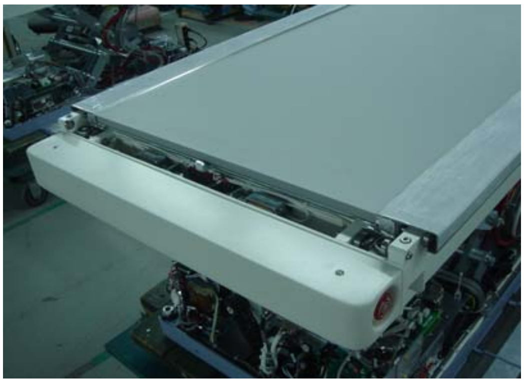
Note: After the table is assembled, an operational check is performed with adjustments made to the Up/Down Limit Board if a correction in table height is necessary (this check is required only for the Elevating Tables).



Endcaps Installation

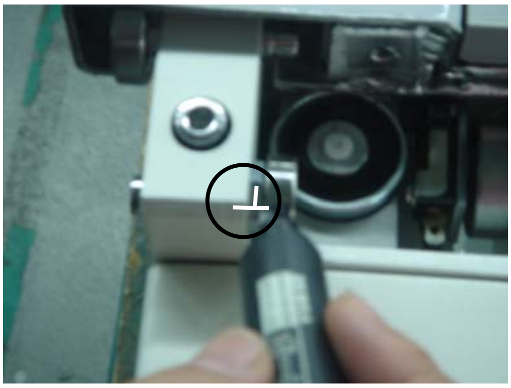
The endcaps are installed as follows:

1. Push the table top to one side.

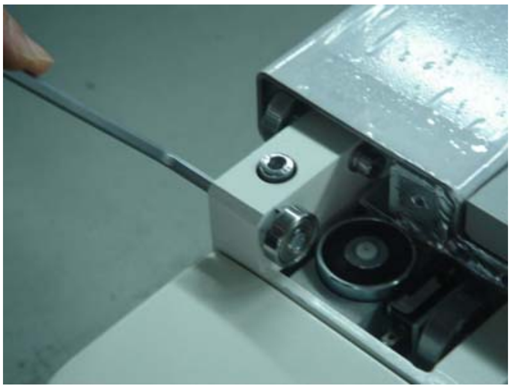


PROTEUS XR/A TABLE TOP	3/4	IST 006

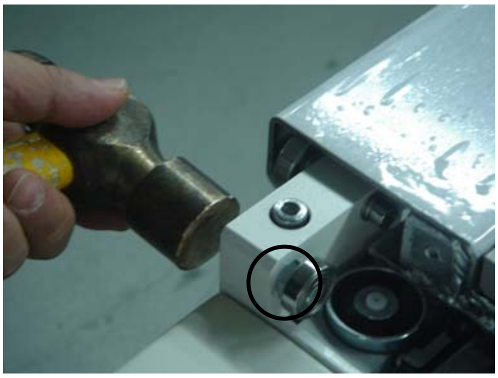
2. Mark a line to indicate the hex nut's location.



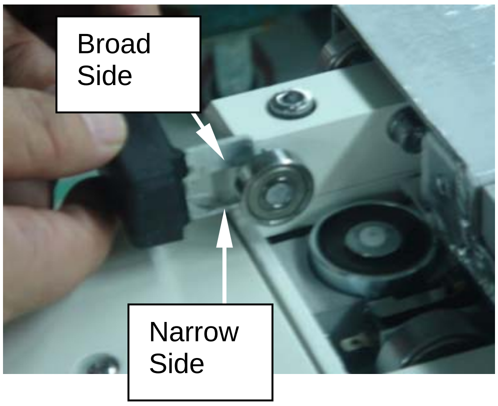
3. Loosen the bearing screws.



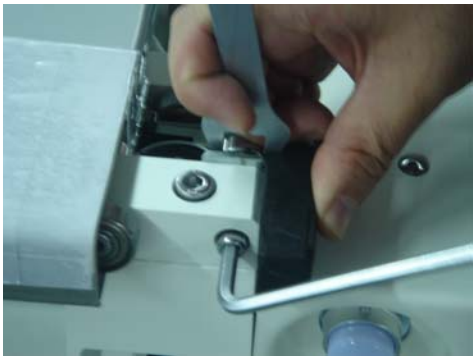
4. Knock the outside of the shaft to leave a space about 3 mm.



5. Install the Rubber Bumper, make sure it's in the direction as below.

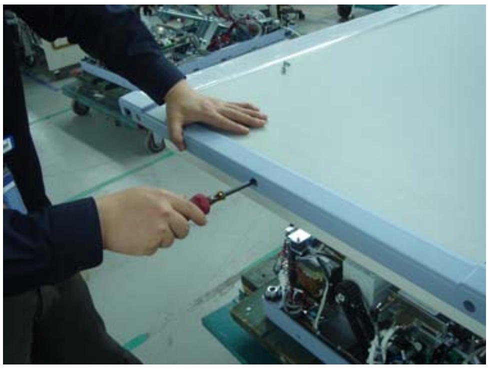


6. Fix the hex nut to make sure the marked line's location not changed, and tighten the screw.

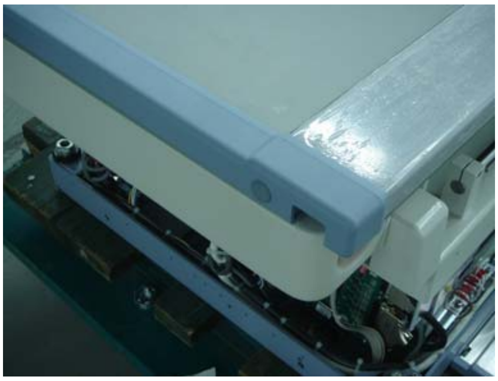


7. Repeat step 2) to 6) to install the other three rubber bumpers.
8. Press on the switches to move back the table top.

9. Install the two end caps with the 6 screws.

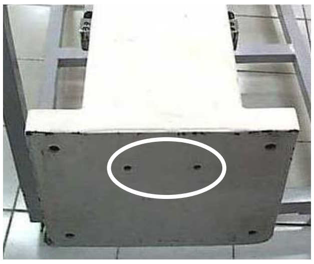


10. Install the screw caps.

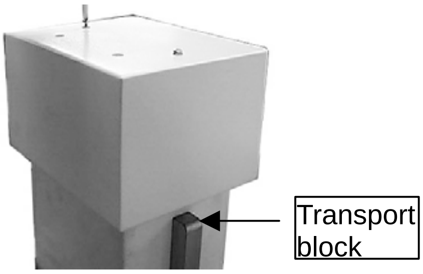


PROTEUS XR/A WALL STAND			**1/2**	**IST 007**
Subassembly: **Install Wall Stand (GPCP No. 600-0301)**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:2*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

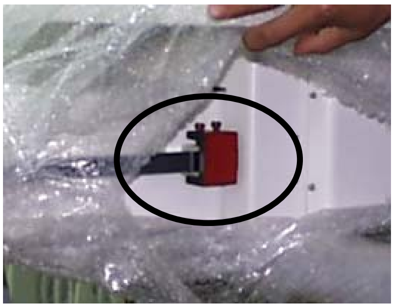
1. Remove the transport bolts of the counterweights. See illustration.



2. Place the wall stand to proper position according to OTS. Refer to page 4-4,4-5 in Proteus XR/a Pre-installation manual for wall mount dimension and page 5-2, 5-3 in Proteus XR/a Pre-installation manual for Room Layout.
3. Remove the transport block plates from wall stand rail top end. See illustration.



4. Remove the transportation clamps on both bucky rails.

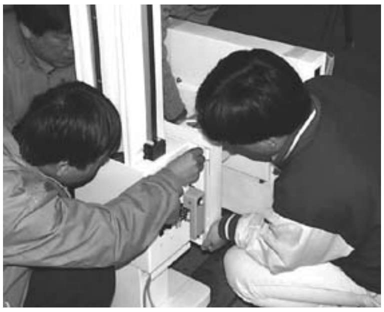


Note: The content with a star is only for the wall stand with a knee spacer.

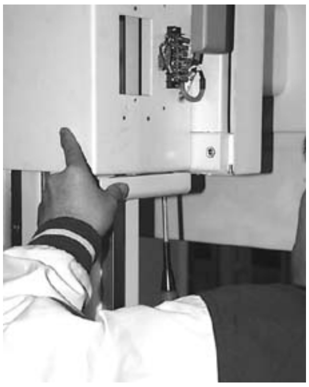
* Fix the carriage at a lower position.

PROTEUS XR/A WALL STAND	**2/2**	**IST 007**

* Mount the Bucky and knee spacer assembly to the carriage.



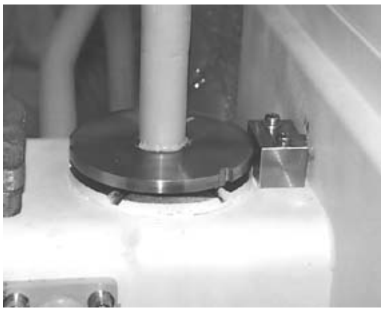
* Fix the cables with the cable retainer.



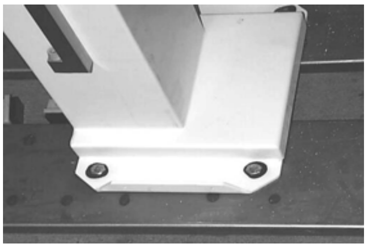
* Mount the LAT bar.

Remove the protective cover on the knee spacer. Insert the LAT bar into the hole, turn the flange to make the keys on the flange insert the slots, then, lock the release bar.

Note: apply grease between the flanges.



* After the counter weight calibration, remove the foot cover, tighten the anchor bolt in a proper position, reinstall the cover finally.



DANGER

THE WALL STAND IS HEAVY. AT LEAST TWO PERSONS ARE REQUIRED TO MOVE AND ERECT IT TO PREVENT PERSONAL INJURY OR EQUIPMENT DAMAGE.

THE FLOOR WHERE THE WALL STAND INSTALLED MUST BE FLAT AND LEVEL TO PREVENT THE WALL STAND FROM FALLING DOWN.

PROTEUS XR/A WALL STAND			**1/8**	**IST 008**
Subassembly: **Install SG100 Wall Stand (GPCP No. 2225849)**				
Purpose: Installation Procedure			*Version no.* 1 *Date:* **10/10/06**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **40 min**	

WARNING

THE SG100 WALL STAND MAY BE FACTORY SET FOR 110VAC OR 220VAC. THE MISMATCH BETWEEN THE VOLTAGE SETTING OF SG100 AND THE POWER SUPPLY VOLTAGE FROM SYSTEM PDU CAN RESULTS IN THE BROKEN POWER FUSE AND LEAD TO THE FAILURE OF SG100 BUCKY. PAY ATTENTION TO CHECK AND ENSURE THE SG100 WALL STAND LINE VOLTAGE AND BUCKY VOLTAGE TO BE SET 220VAC AND 230VAC RESPECTIVELY (SEE STEP 9,10 IN THIS JOB CARD) ON THE INSTALL SITES BEFORE POWER ON.

DANGER

THE WALL STAND IS HEAVY. AT LEAST TWO PERSONS ARE REQUIRED TO MOVE AND ERECT IT TO PREVENT PERSONAL INJURY OR EQUIPMENT DAMAGE.

***Note:** The floor where the Wall Stand installed must be flat and level to prevent the Wall Stand from falling down.*

***Note:** Before installing the SG100 Wall Stand, the X-ray tube supports and table must firstly be installed.*

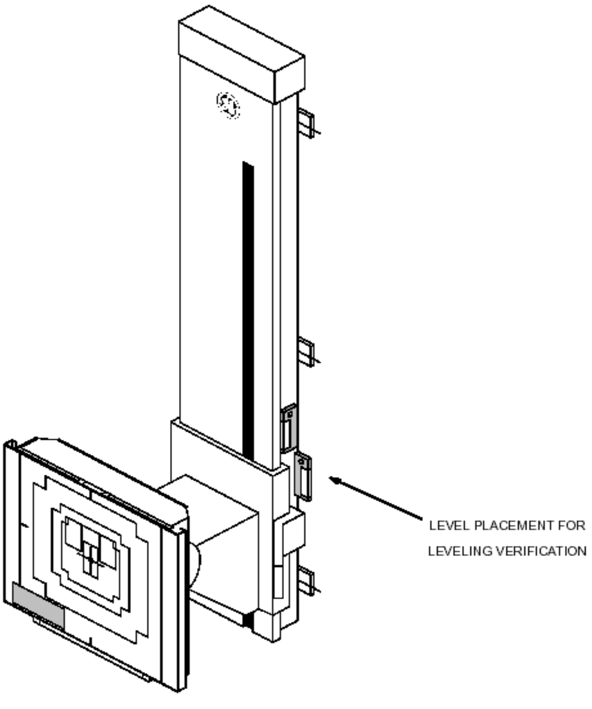
***Note:** The procedures in this section are concerted with the revision 6 of SG100 Wall Stand Service Manual (GPCP Number 2150297-100). For the reason of the update and change in that manual, it is recommended to see also the latest Service Manual of SG100 Wall Stand for reference.*

1. Move the SG100, in the shipping container, to the installation area. (Refer to page 5-2, 5-3 in Proteus XR/a Pre-installation manual for Room Layout). Leave the container in the horizontal position. Unpack the SG100 from the shipping container.

2. Using two people, carefully raise the SG100 to an upright position.

PROTEUS XR/A WALL STAND	2/8	IST 008

3. Stand the SG100 against the wall and attach to the wall using the locally provided 6 wall anchors.
4. Align the SG100 laterally across the wall, to the X-ray Tube Suspension beam or table centerline using the centerline marks on the wall and floor or the Laser Alignment Tool.



Note: ***The SG100 must be level on the wall with no more than 1/16 in. (1.5mm) deflection to ensure that the anchors holding the SG100 to the wall does not come loose over time. Use the shims provided with SG100 to ensure this requirement.***

5. Verify the SG100 level across wall to ensure that no more than 1/16 in. (1.5mm) deflection exist, laterally or vertically. See Illustration for recommended placement of the levels.
6. Insert supplied shims, as required, between the SG100 and the wall.
7. Tighten the six SG100 anchor bolts according to the torque specifications for the anchors.
8. Check the Counterweight and Bucky Carriage Counterbalance, and add or remove Counterweight when required. (See SG100 Service Manual, GPCP Number 2150297-100)

PROTEUS XR/A WALL STAND	3/8	IST 008

WARNING **THE SG100 WALL STAND MAY BE FACTORY SET FOR 110VAC OR 220VAC. THE MISMATCH BETWEEN THE VOLTAGE SETTING OF SG100 AND THE POWER SUPPLY VOLTAGE FROM SYSTEM PDU CAN RESULTS IN THE BROKEN POWER FUSE AND LEAD TO THE FAILURE OF SG100 BUCKY. PAY ATTENTION TO CHECK AND ENSURE THE SG100 WALL STAND LINE VOLTAGE AND BUCKY VOLTAGE TO BE SET 220VAC AND 230VAC RESPECTIVELY (SEE STEP 9,10 BELOW) ON THE INSTALL SITES BEFORE POWER ON.**

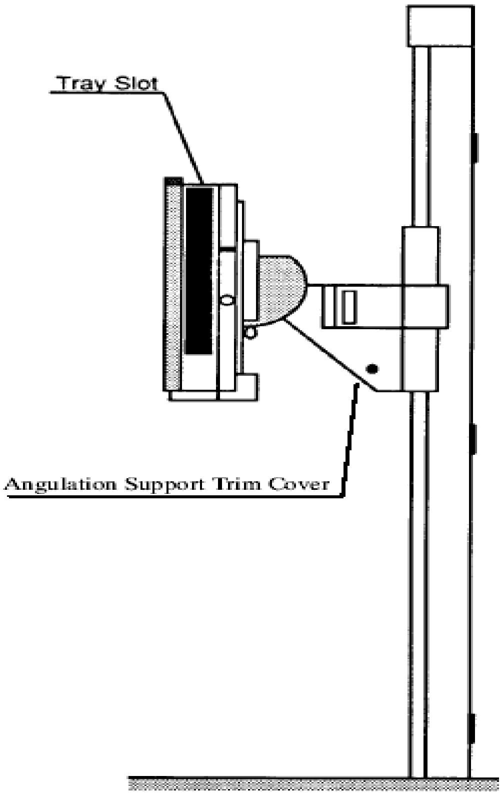
9. Check the lock board jumper according to the table below to ensure the line voltage setting is 220VAC. Set the TS-6 jumpers to 220VAC when necessary.

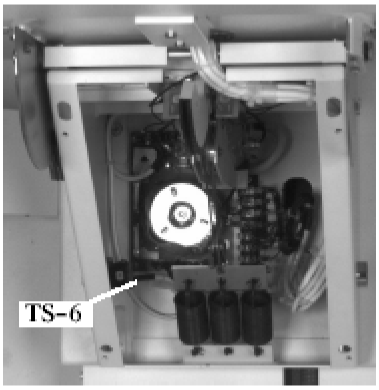
   To access the lock board, remove the angulation support trim cover (behind the Bucky panel, at a 45 angle facing the floor.). Remove the four screws. (See following Illustrations.)

CAUTION **The SG100 Wall Stand line voltage may be factory set for 110VAC or 220 VAC. Pay attention to check and ensure the line voltage to be set 220VAC on the install site via jumper settings on its lock board.**

Check and set the jumpers when necessary according to the following table:

LINE VOLTAGE	Board: 45433412 TS-6 JUMPERS
220 VAC	2-3 & 4-5
110 VAC	3-5 & 4-6



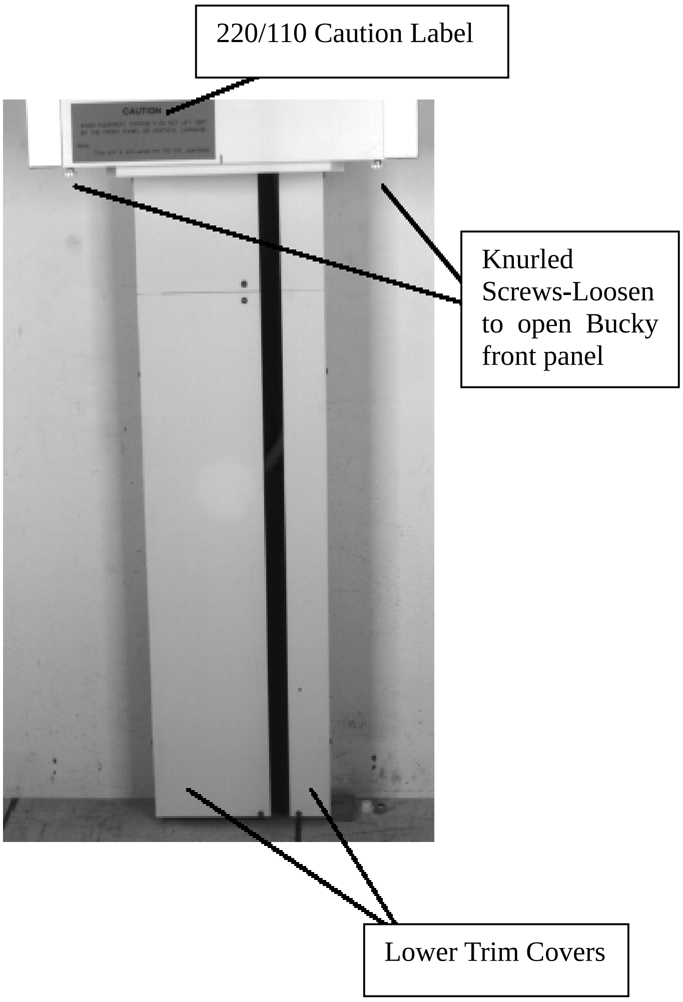


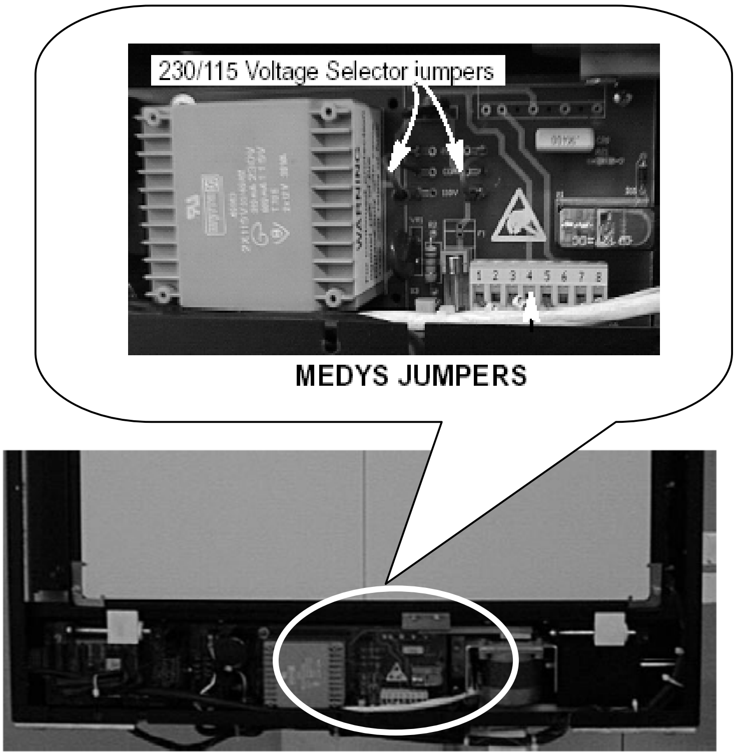
PROTEUS XR/A WALL STAND	4/8	IST 008

10. Set the Bucky voltage jumpers to the appropriate position for 230V. The Bucky voltage jumpers are located next to the signal transformer in the electronic compartment behind the front panel (see following illustrations).

CAUTION **The SG100 Wall Stand Bucky voltage may be factory set for 115VAC or 230 VAC. Pay attention to check and ensure the Bucky voltage to be set 230VAC on the install site via Bucky voltage jumper.**

To access this electronic compartment, turn the large knurled screws located underneath the front panel counterclockwise. Tilt the front panel up and secure it with the prop on the right hand side. Then loosen, without removing, the three flathead screws on the bottom of the lower panel, remove the two top roundhead screws and slide the black cover plate up and out to access the jumpers.


220/110 Caution Label
Knurled Screws-Loosen to open Bucky front panel
Lower Trim Covers


230/115 Voltage Selector jumpers
MEDYS JUMPERS

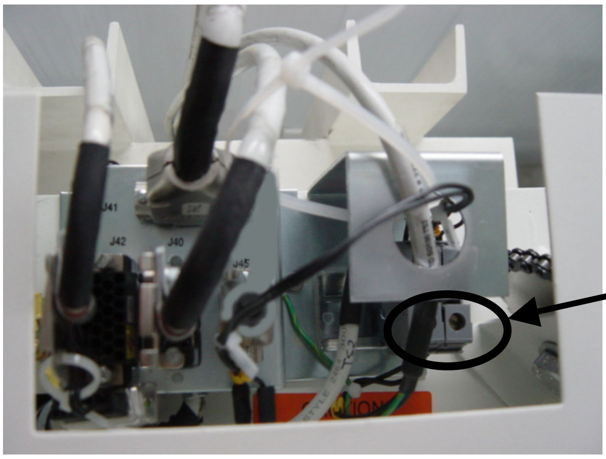
MEDYS JUMPERS

PROTEUS XR/A WALL STAND	5/8	IST 008

11. Route and connect system cables to the I/O panel at the top of the SG100 (see table below).

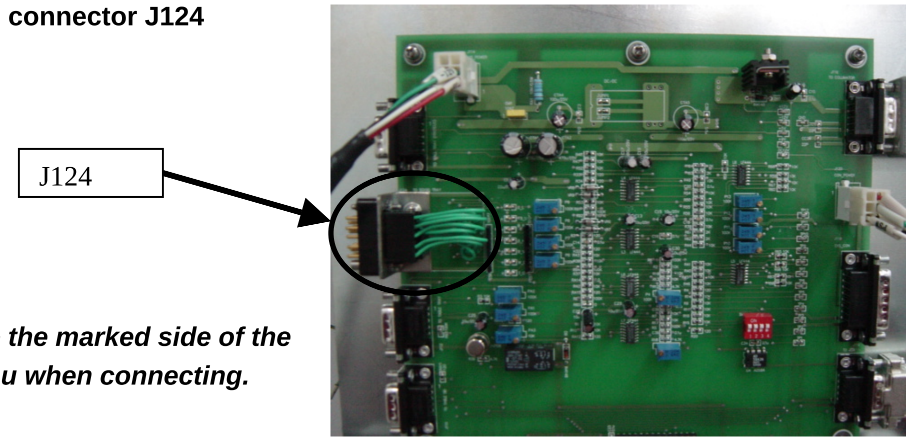
Cable Name	Cable Part Number	SG100 end (stick to connectors on the I/O panel at the top of the SG100) (See illustration "SG100 connectors" below)	Other end
SG100 Ion Chamber Cable	2145642-2	J40	Jedi connector AEC2 (refer to page 2-92 in Job Card IST 020 "Electrical Connections")
SG100 Auto Tray Cable	2145644-2	J41	System I/F Board connector J124 (See illustration "System I/F Board connector J124" in next page)
SG100 Bucky Cable	2145641-2	J42	Jedi Wall Bucky (J6) connector (refer to page 2-92 in Job Card IST 020 "Electrical Connections")
SG100 Power Supply Cable	2151729-2	Power (See illustration "SG100 connectors" below)	PDU connector TM4 SG100 Power (See illustration "PDU connector TM4 SG100 Power" in next page)
SG100 Ground Cable	2140362-2	Ground	PDU ground

Illustration : SG100 connectors



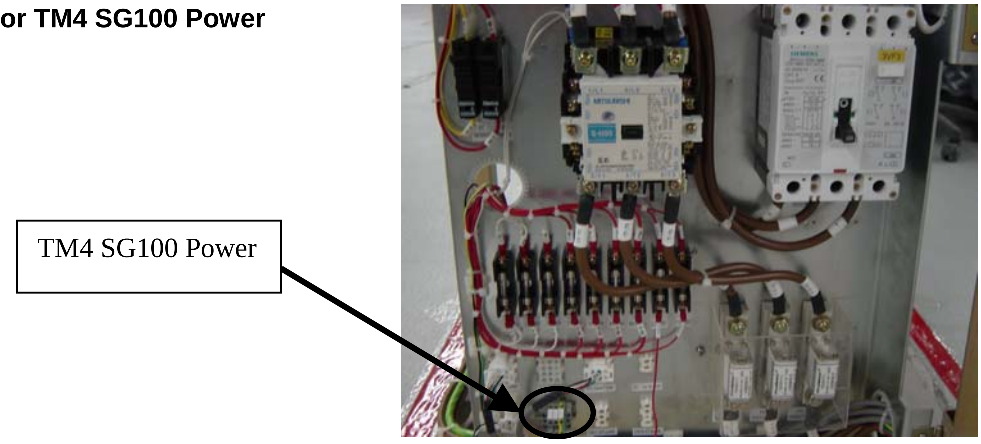
Connect the two black wires of SG100 Power Supply Cable into these two connectors.

Illustration: **System I/F Board connector J124**

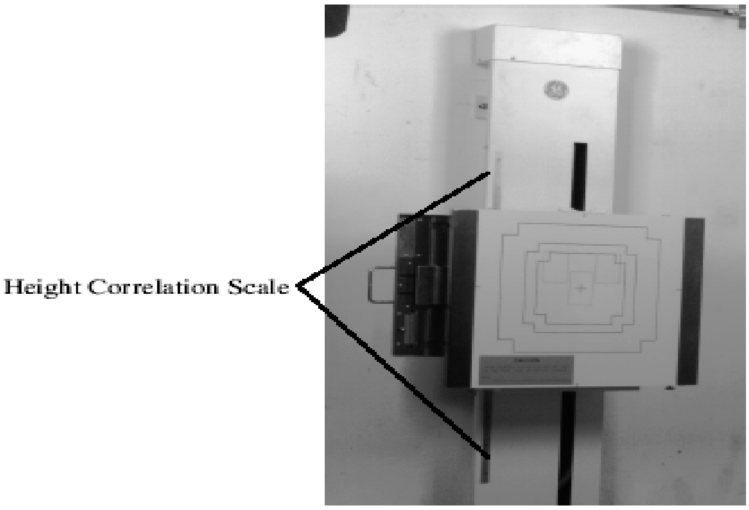


Note: ***Pay attention to ensure the marked side of the cable plug to face to you when connecting.***

Illustration: PDU connector TM4 SG100 Power



12. Attach the self-adhesive height correlation scale to the SG100 Wall Stand so it corresponds with the height scale on the x-ray tube hanger or stand.



13. Perform Microswitch Adjustment (Automatic Collimator Option only)

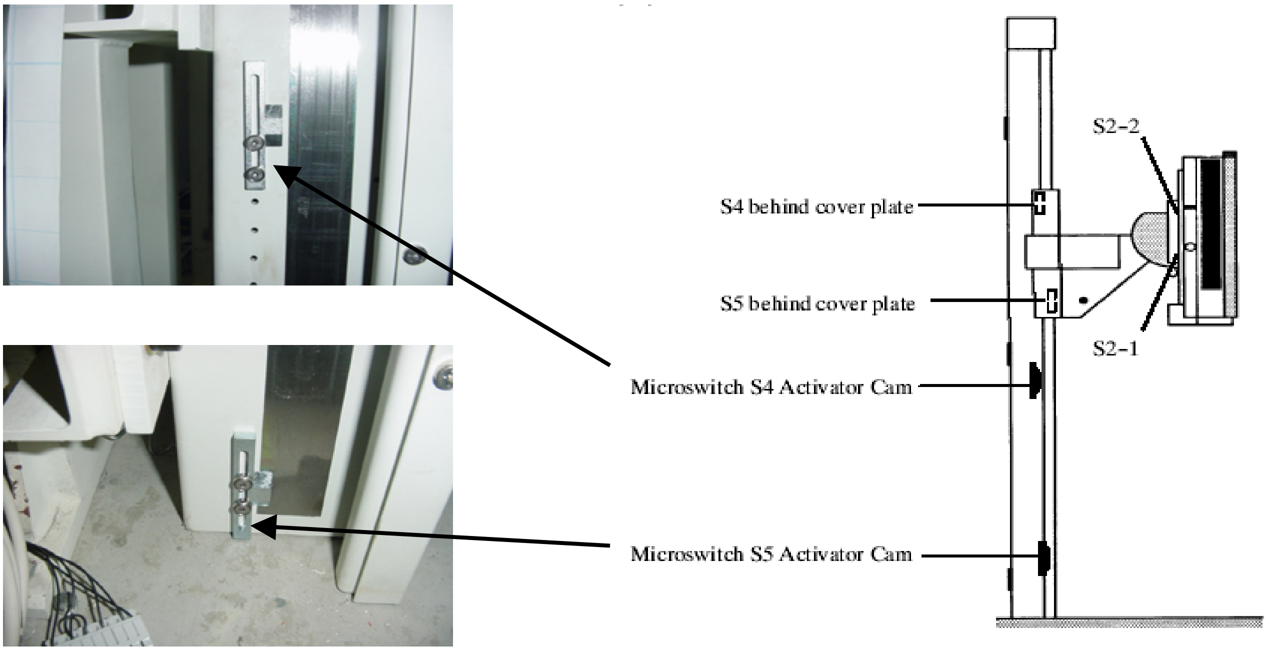
Five microswitches indicate the position of the Bucky (Refer to illustration below). The microswitch activator cams for S4 (upper, near discrete SID point) and S5 (lower, far discrete SID point) may need slight adjustment at installation time.

Microswitches S4 and S5 are located in the vertical brake assembly on the side opposite to the vertical lock handle. The activator cams for microswitches S4 and S5 are located on the vertical column. Verify that the activator cams actuate S4 and S5 as described below:

Note: This operation is carried out with the Bucky angulated to full horizontal position

Check that the activator cam for microswitch S4 actuates S4 when the Bucky is at the same level as the top of the x-ray table (near discrete SID point). Reposition the cam actuator if necessary.

Check that the activator cam for microswitch S5 actuates S5 when the Bucky is in the lowest vertical position (far discrete SID point) with the foldable legs extended and touching the floor. Reposition the cam actuator if necessary.



Note: Vertical Bucky Wall Stand not equipped with the automatic collimator option do not have positioning microswitches.

Check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position. (see parameter 9 “High, low POS. distance”, Job Card CAL 002)

CAUTION

The default value of the distance between Low Auto Exposure position and High Auto Exposure position set in System Console (see parameter 9 “High, low POS. distance”, Job Card CAL 002) is 40cm, which is different from the default distance set on SG100 Wall Stand (44cm). So it’s a must to check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position when performing the SG100 SID calibration (refer to Job Card CAL 006 in Chapter 4), even if the positions of the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam are not modified and be on the default position in the upper step.

PROTEUS XR/A WALL STAND	8/8	IST 008

14. Warning and Specification Labels

    Warning labels are shipped with the SG100 for the foldable legs. The labels are written in three languages: English, French and Spanish.

    Locate the warning labels and attach the label of the appropriate language to the right-side folder leg (leg with lock release knob).

    Specification labels in four languages (French, German, Italian, Spanish) are shipped for adapting the SG100 specification label to the corresponding language where the SG100 is installed. The original specification label, located in the upper lock-handle side of the vertical column, is in English.

    If necessary, locate the specification label and attach the label of the appropriate language over the original specification label.

15. Verify the Bucky grid speed setting.

    The Bucky (Medys) must be set for Super speed using a 36L/cm grid. Normally this is done at the factory. Verify that the switches are correctly set and if necessary change their settings, refer to the procedure in Job Card LJS02 “SG100 VERTICAL BUCKY STAND MEDYS BUCKY SWITCHES” of SG100 Service Manual (GPCP No. 2150297).

PROTEUS XR/A WALL STAND			**1/22**	**IST 009**
Subassembly: **Install SG120 Wall Stand (GPCP No.: 2402562)**				
Purpose: Installation Procedure			*Version no.* 2 *Date:***10/10/06**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **40 min**	

1. Unpacking

   SG120 is shipped in one crate to facilitate transport and installation.

   1) Move SG120, in the shipping container, to the installation area. Leave the container in the horizontal position.
   2) Remove the banding and cardboard box that is covering the equipment and clamped to the wooden pallet.
   3) Remove the shipping wooden crosspieces holding SG120 to the pallet.
   4) Rest the bottom end of SG120 on soft support material outside the shipping container.

2. Standing

   1) Before standing, remove the top cover to ensure the pulley chains are on their sprockets. If they are not, try to set the chains on the sprockets. USE CAUTION.

      If the problem cannot be easily corrected, SG120 must be returned as DOA.
   2) Using two people, carefully raise SG120 to upright position.

WARNING

INJURY HAZARD! AT LEAST TWO PEOPLE ARE REQUIRED TO TURN OR TILT SG120. SG120 WEIGHS APPROXIMATELY 180 KG (330 LBS) AND CAN EASILY BE TIPPED OR UNBALANCED.

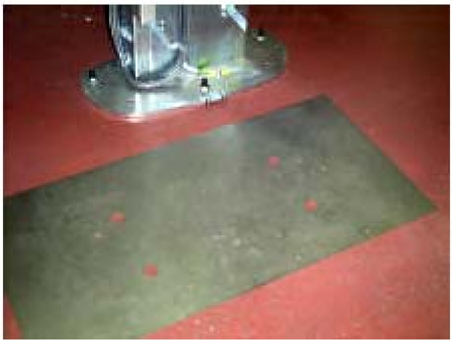
3. Floor mounting

   Tools required:
   - Standard service person tool kit
   - Drill template
   - Wrench set
   - Laser alignment tool

PROTEUS XR/A WALL STAND	**2/22**	**IST 009**

Procedure:

1) Using the drill template supplied with the equipment (included in installation kit), set the position of SG120 taking into account.

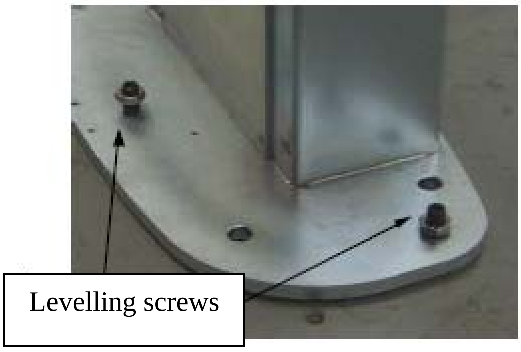


- The distance focal dependant to the anti-diffusion grid.
- The minimum recommended distance to the wall indicated on the drill template.

2) Place and align SG120 drill template laterally using the collimator light or the laser alignment tool.
3) Mark the holes using the template.

Note: ***Set the template to the floor means of adhesive tape to avoid it can be displaced.***

4) Remove the template.
5) Drill the holes and place the anchors.
6) Using two people, carefully raise SG120 to upright position and move to the mounting location. Install the anchor bolts.
7) Level the equipment using the 3 levelling screws and tight the anchor bolts.



Note: ***Tightness that anchors need to set to is 50 Nm.***

8) Recheck the alignment of SG120.

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Note: ***SG120 Vertical Bucky Stand can be either LEFT or RIGHT loaded. The equipment is factory LEFT handed configured. The procedure to change the configuration follows.***

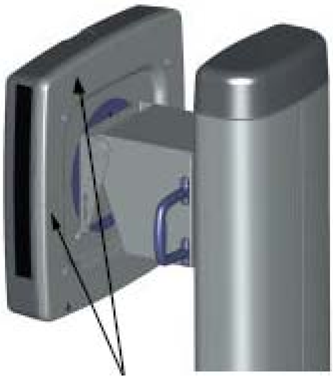
WARNING

MAKE SURE THE EQUIPMENT IS SWITCHED OFF DURING THIS OPERATION.
DURING THIS OPERATION, THE BUCKY CARRIAGE AND COUNTERWEIGHT CARRIAGE CAN MOVE.

4. Bucky Reversal Procedure

1) Remove covers and panel

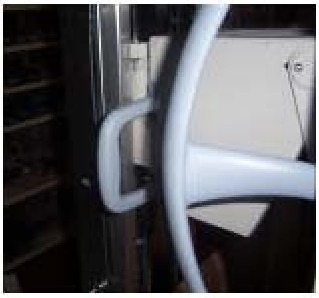
a. Remove the back covers from the bucky support assembly.



b. Remove the front panel from the bucky support.

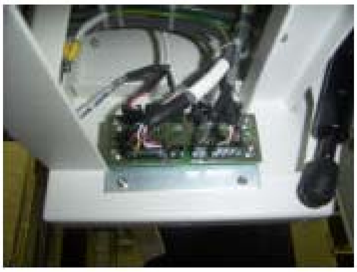
2) Vertical lock handle

The handle is located on the left side of the bucky support assembly.



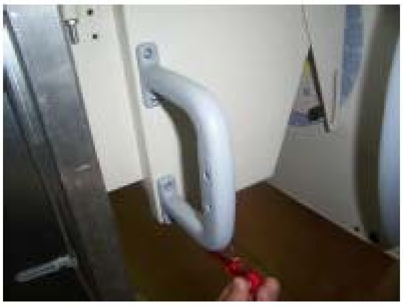
PROTEUS XR/A WALL STAND	4/22	IST 009

a. Remove the plate below the bucky support assembly to access to the interface board.



Interface Board

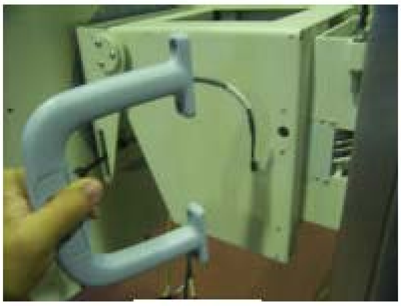
b. Release the switch cable from the interface board, J8.
c. Remove with care the four screws that hold the handle.



d. Extract carefully the handle with the switch cable.

e. To assembly the handle on the new side, first remove the white plug for cable insertion and the four screws.

f. Pass the switch cable through the hole on the new side and fix the handle with the 4 screws.



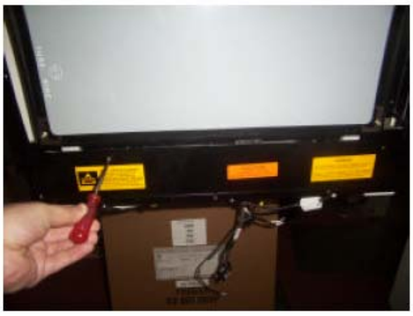
g. Connect the switch cable to J8 on interface board and assembly the plate removed in step a in 2) above.

3) Bucky assembly

To change the configuration of the bucky for the cassette tray insertion, follow the next procedure:

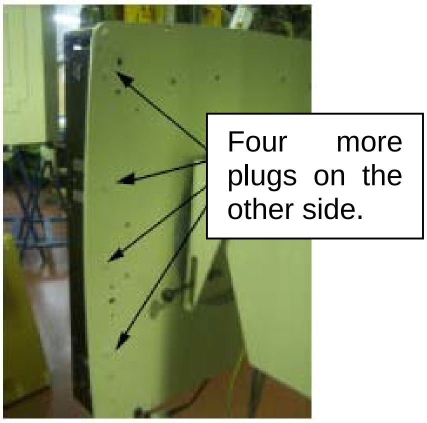
Note: ***There is some difference between with patient support and without patient support. Please confirm whether you've installed patient support.***

a. Extract the cassette tray with CAUTION. THE BUCKY CARRIAGE WILL MOVE UP.
b. Remove the bucky cover protecting the bucky electronic devices.



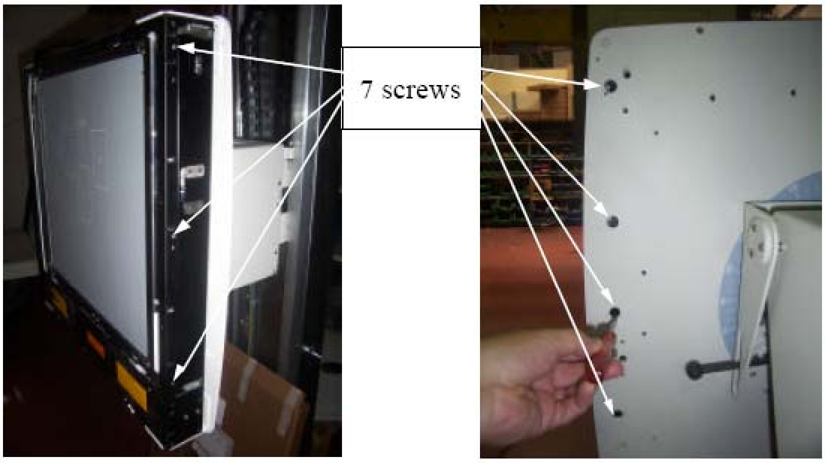
c. Remove the 8 white plugs (4 on each side) located on the back of the bucky support.

Note: ***Remove the 6 white plugs (3 on each side) located on the back of the bucky support, for the other 2 on the top (1 on each side) are covered if the patient support option is installed.***



Four more plugs on the other side.

d. Remove the 7 screws that hold the lateral cover of the bucky: 3 of them are situated on the bucky frame and the other 4 are accessible from the back of the bucky support through the holes left uncovered in the previous step.

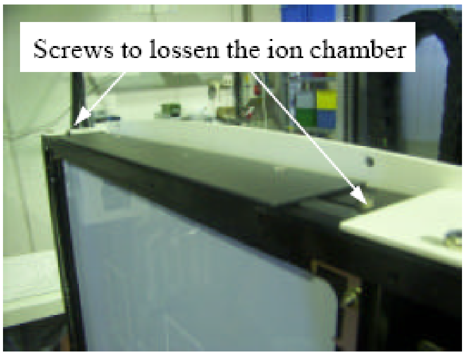


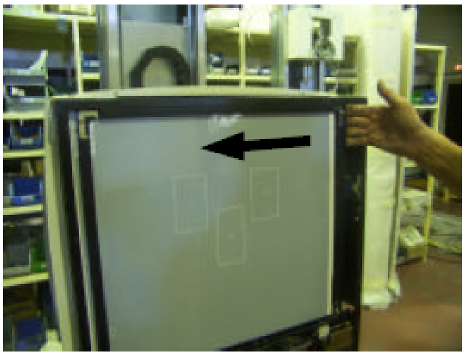
Note: ***When the patient support option is installed, one of the 4 holes located on the back of the bucky support (the one of the top on either side) is partially obstructed by the magnets that are assembled with the patient support option. To access the four screws from the back of the bucky support referred in step d, it is first needed to disassembly the magnets that obstruct the holes.***

e. Once the lateral cover is free, move it to the opposite side of the bucky to fix it. To enable the displacement of the lateral cover, It is needed you cut the flanges that hold the cable to the bucky frame.

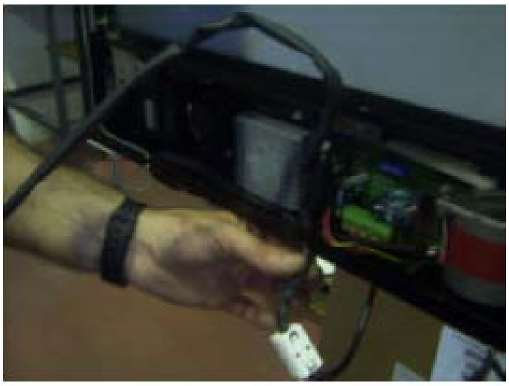
PROTEUS XR/A WALL STAND	7/22	IST 009

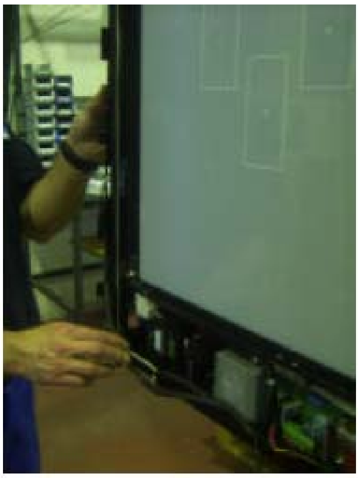
Note: ***Since the ion chamber is assembled to the bucky, you can temporary displace it to let the lateral cover pass through the area between the bucky structure and the ion chamber. For that, just loosen the screws that hold the ion chamber and move it in order to facilitate the operation.***





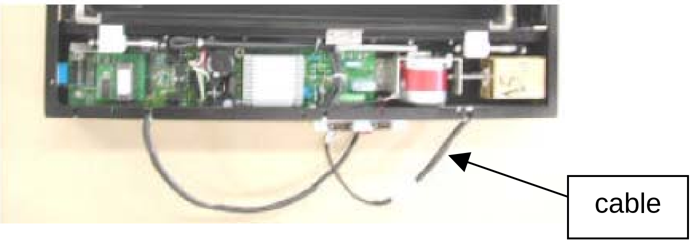
f. Guide the cable, making sure that you do not interfere with the internal bucky mechanism and fix it with flanges to the bucky sheet metal frame.



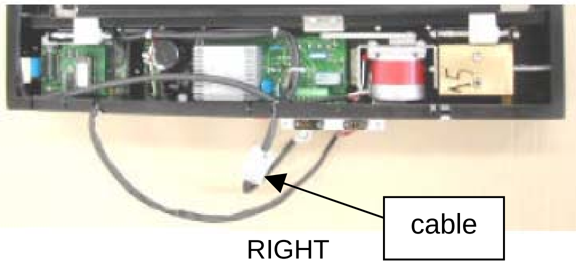


g. Make sure about the guiding of the cable. See below bucky for LEFT handed loading (factory) and RIGHT handed loading.

MEDYS Bucky



LEFT



RIGHT

h. Fix the lateral cover to the opposite side with the 7 screws removed in step c in 3) above.

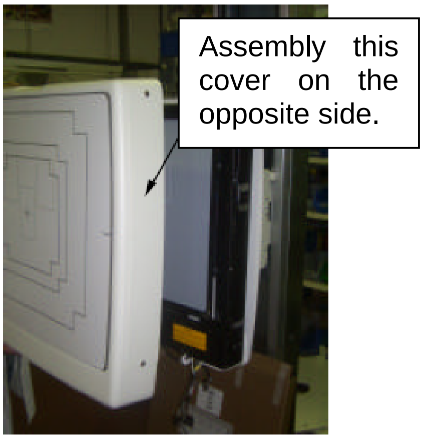
Note: ***When the patient support is installed, remember to fix the magnets removed in order to be able to access the screws.***

i. Insert again the 8 white plugs removed in step c.

Note: ***When the patient support is installed, there are 6 white plugs need to be insert.***

j. Assembly the bucky cover removed in step b.

k. In the front panel, change the position of the cover to the opposite side.



l. To finish, assembly the front panel and the back covers removed in 4. 1) (Remove covers and panel) above.

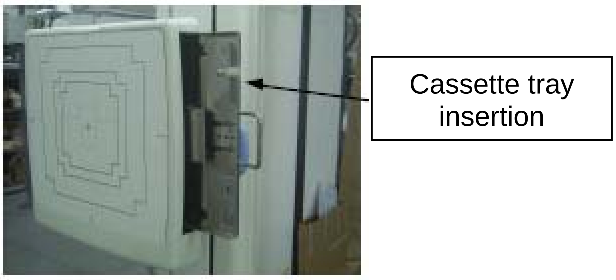
m. Insert the tray using the new configuration.

Note: ***Check the Counterweight and Bucky Carriage Counterbalance, and add or remove Counterweight as following when required.***

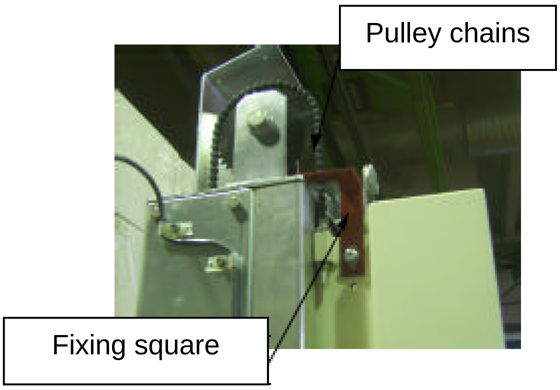
5. Counterweight and Bucky counterbalance check

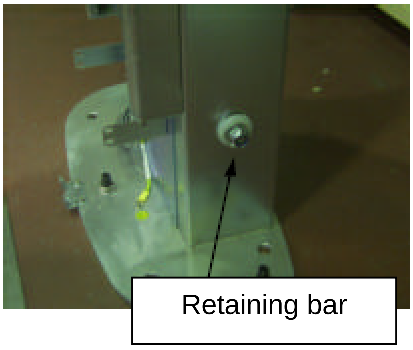
Even though the bucky carriage is factory balanced this procedure must be carried out.

1) Remove the column lateral covers.
2) Insert the cassette tray in the bucky.



3) Place a medium size cassette into cassette tray.
4) Loosen and remove the fixing square and retaining bar.





5) Check that the counterweight and bucky carriage are well balanced:
   - **WITH POWER ON**: Release the electromechanical brake and check the bucky carriage can move easily in vertical direction.
   - **WITH POWER OFF:** Check that the bucky carriage can move freely and smoothly in vertical direction.

Note: ***The electromechanical brakes do not lock with power OFF.***
If the counterweight and bucky carriage are not well balanced, follow the procedure detailed below to add or remove counterweights.

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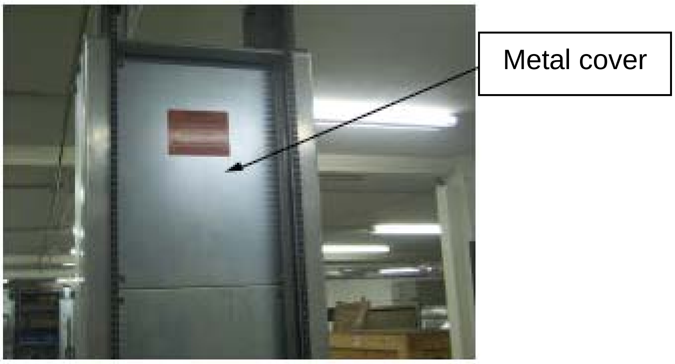
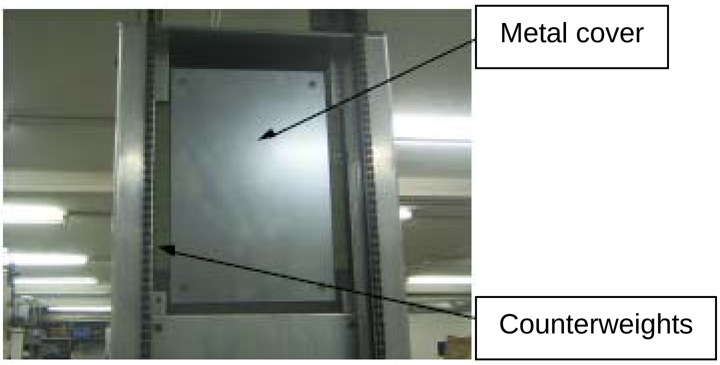
6. Adding or removing counterweights

WARNING **DURING THIS OPERATION, THE BUCKY CARRIAGE AND COUNTERWEIGHT CARRIAGE CAN MOVE.**

1) Move the carriage to the lowest position.
2) Remove the metal cover on the front of the column.



3) Remove the second metal cover to access the counterweights.



4) Place or remove the counterweights with care.
5) Reinstall the two sheet metal covers and the column lateral covers.

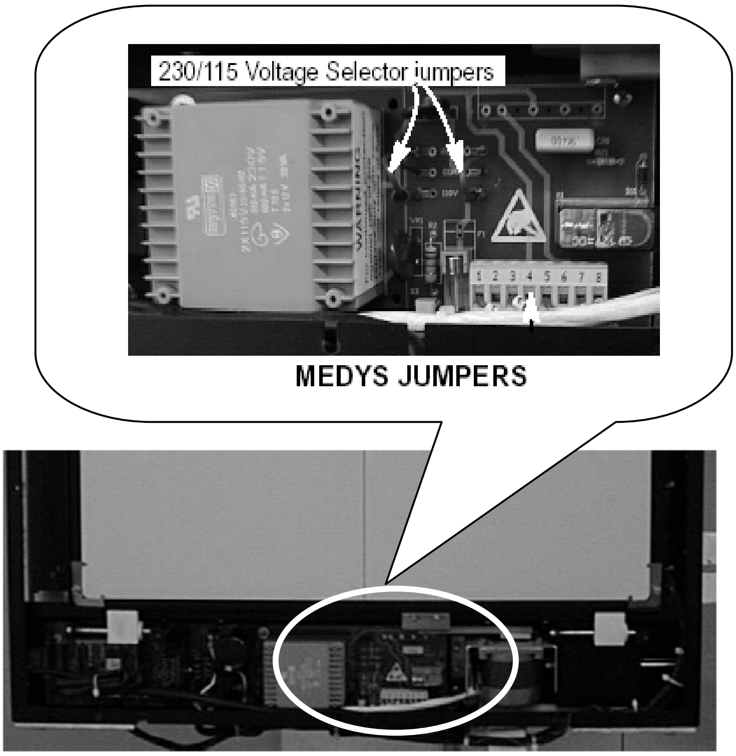
7. Electrical Installation

1) Power cable connection
   Power and ground cables are supplied optionally with the equipment.
   a. Connect power supply cable from J1 VAC on the bucky control board.
   b. Connect the ground cable to the ground stud on the bucky control board.
2) System cable connection
   System Cable Connection (Code: 2145641-2, 2145642-2 and 2145644-2) is supplied optionally with SG120.

a. Connect Bucky cable (Code: 2145641-2) to J42 on the bucky control board.

WARNING

ENSURE THAT THE BUCKY IS SET CORRECTLY FOR THE GENERATOR VOLTAGE (115VAC OR 230VAC). THE BUCKY IS SET FOR 115VAC OR 230VAC IN FACTORY TO AVOID EQUIPMENT DAMAGED. PAY ATTENTION TO CHECK THE VOLTAGE, AND SET JUMPERS BY REFERRING TO THE VOLTAGE CHANGE INSTRUCTIONS IN THE BUCKY MANUAL.



MEDYS JUMPERS

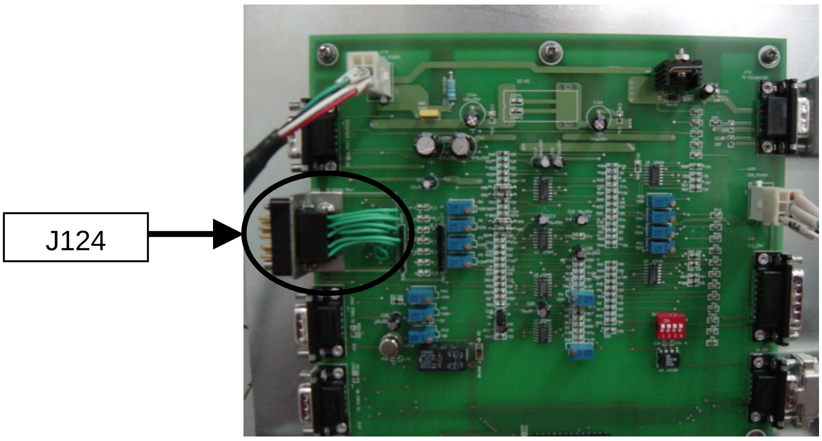
b. Connect Ion Chamber cable (Code: 2145642-2) to J40 on the bucky control board.

c. Connect Sensing Tray cable (Code: 2145644-2) to J41 on the bucky control board.

Cable Name	**Cable Part Number**	**SG120 end (stick to connectors on the I/O panel at the top of the SG120)**	**Other end**
SG120 Ion Chamber Cable	2145642-2	J40	Jedi connector AEC2 (refer to page 2-94 in Job Card IST 020 “Electrical Connections”)
SG120 Auto Tray Cable	2145644-2	J41	System I/F Board connector J124 (See illustration “System I/F Board connector J124” in next page)

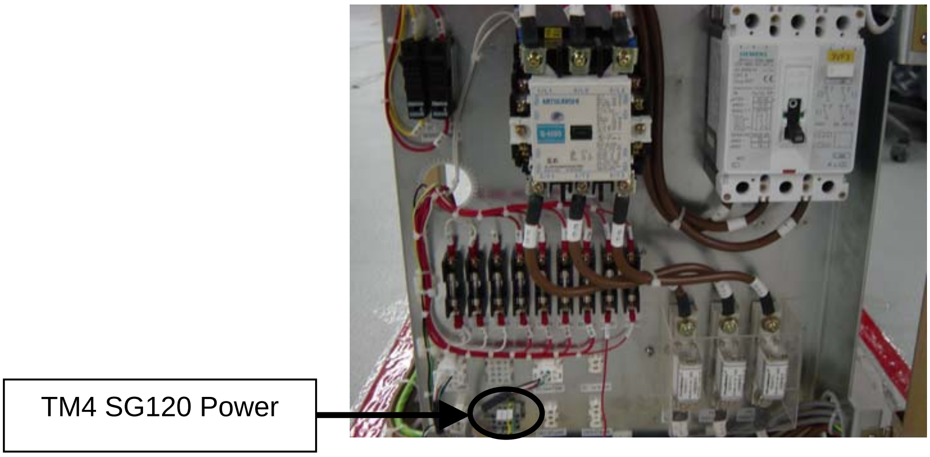
Cable Name	**Cable Part Number**	**SG120 end (stick to connectors on the I/O panel at the top of the SG120)**	**Other end**
SG120 Bucky Cable	2145641-2	J42	Jedi Wall Bucky (J6) connector (refer to page 2-94 in Job Card IST 020 "Electrical Connections")
SG120 Power Supply Cable	2410108-2	Power	PDU connector TM4 SG120 Power (See illustration "PDU connector TM4 SG120 Power" in next page)
SG120 Ground Cable	2140362-2	Ground	PDU ground

Illustration: System I/F Board connector J124



Note: ***Pay attention to ensure the marked side of the cable plug to face to you when connecting.***

Illustration: PDU connector TM4 SG120 Power



8. Perform Microswitch Adjustment (Automatic Collimator Option only)

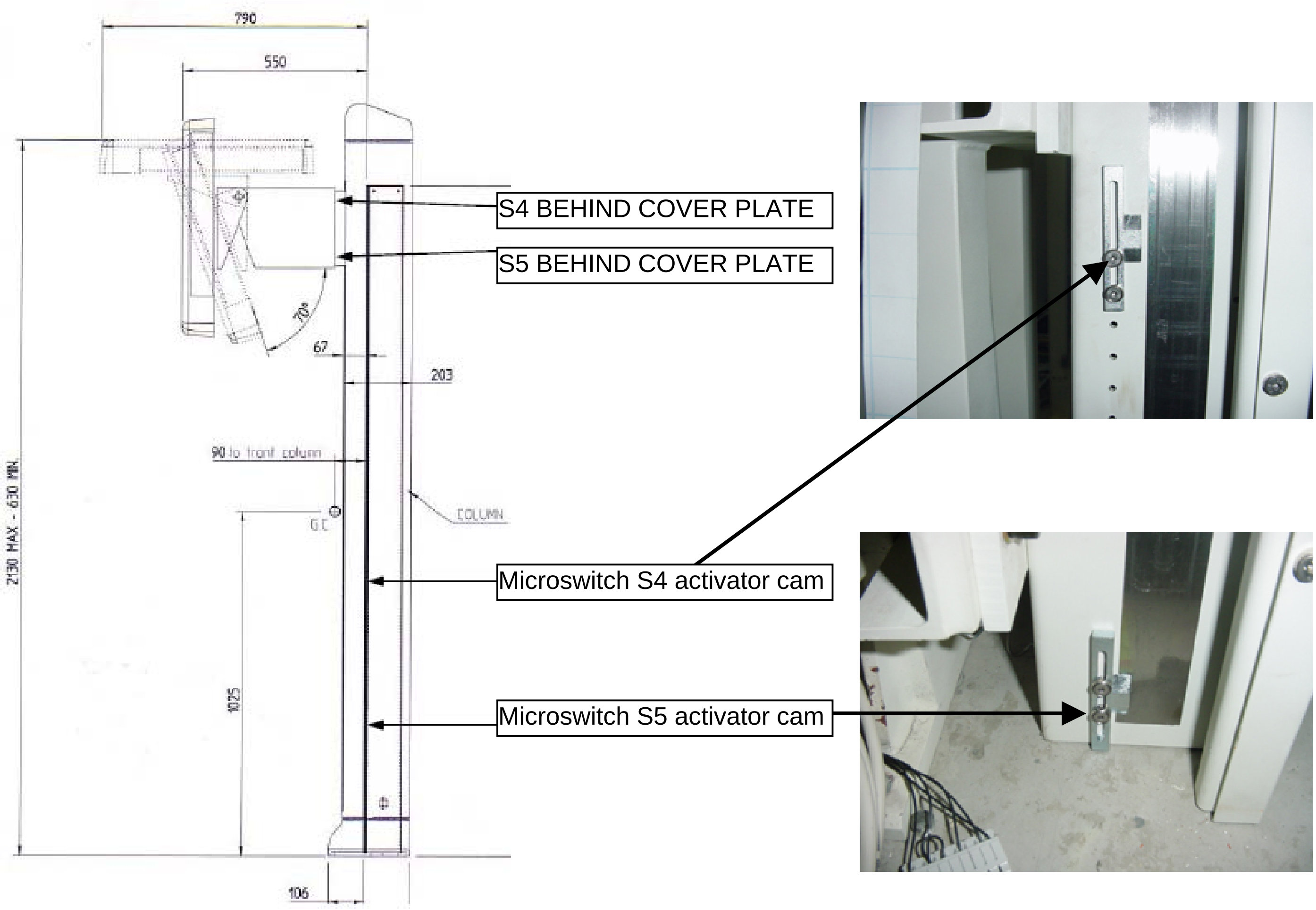
Five microswitches indicate the position of the Bucky (Refer to illustration below). The microswitch activator cams for S4 (upper, near discrete SID point) and S5 (lower, far discrete SID point) may need slight adjustment at installation time.

Microswitches S4 and S5 are located in the vertical brake assembly on the side opposite to the vertical lock handle. The activator cams for microswitches S4 and S5 are located on the vertical column. Verify that the activator cams actuate S4 and S5 as described below:

Note: This operation is carried out with the Bucky angulated to full horizontal position

Check that the activator cam for microswitch S4 actuates S4 when the Bucky is at the same level as the top of the x-ray table (near discrete SID point). Reposition the cam actuator if necessary.

Check that the activator cam for microswitch S5 actuates S5 when the Bucky is in the lowest vertical position (far discrete SID point) with the foldable legs extended and touching the floor. Reposition the cam actuator if necessary.


790
550
70°
67
203
90 to front column
G.C
COLUMN
2130 MAX - 630 MIN
1025
106
S4 BEHIND COVER PLATE
S5 BEHIND COVER PLATE
Microswitch S4 activator cam
Microswitch S5 activator cam

Note: Vertical Bucky Wall Stand not equipped with the automatic collimator option do not have positioning microswitches.

Check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position. (see parameter 9 “High, low POS. distance”, Job Card CAL 002)

CAUTION **The default value of the distance between Low Auto Exposure position and High Auto Exposure position set in System Console (see parameter 9 “High, low POS. distance”, Job Card CAL 002) is 40cm, which is different from the default distance set on SG100 Wall Stand (44cm). So it’s a must to check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position when performing the SG120 SID calibration (refer to Job Card CAL 006 in Chapter 4), even if the positions of the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam are not modified and be on the default position in the upper step.**

9. Warning and Specification Labels

   Specification labels in seven languages (Spanish, English, French, German, Portuguese, Chinese and Japanese) are shipped for adapting the SG120 specification label to the corresponding language where the SG120 is installed. The original specification label, located in the upper lock-handle side of the vertical column, is in English.

   If necessary, locate the specification label and attach the label of the appropriate language over the original specification label.

10. Verify the Bucky grid speed setting.

    The Bucky (Medys) must be set for Super speed using a 36L/cm grid. Normally this is done at the factory.

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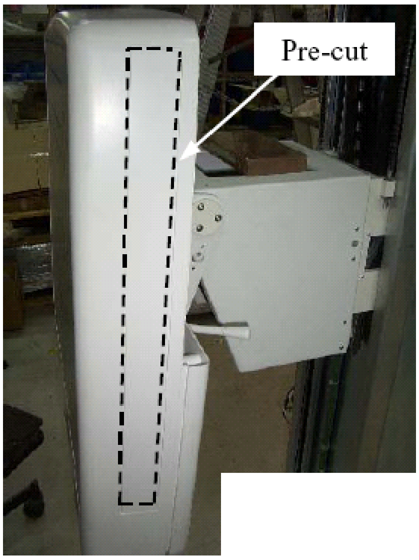
11. Covers assembly

   1) Bucky covers
      The bucky covers (1 front cover + 2 rear covers) of the SG120 are factory assembled. Only the next procedure has to be carried out:

CAUTION

There are cutting operations to be made on some pre-cut areas in most of the types of SG120 covers.
The cutting operation has to be carried out with CAUTION to avoid personal injury or damage to the cover.
It is not recommended to carry out the cutting work in only one step, but to repeat the cutting operation carefully and as many times as necessary until being able to remove easily the cover part to reject.

a. Cut with an appropriate tool the pre-cut slot located on one of the sides of the front bucky cover for cassette tray insertion. If you wish LEFT hand load, cut the left side of the cover; if you wish RIGHT hand load, cut the right side of the cover.



***Note:** The equipment is factory LEFT handed configured, so the LEFT pre-cut side of the cover should normally be cut, unless you want to inverse the tray insertion. If you wish to change the hand load configuration, follow the procedure detailed in 4 above.*

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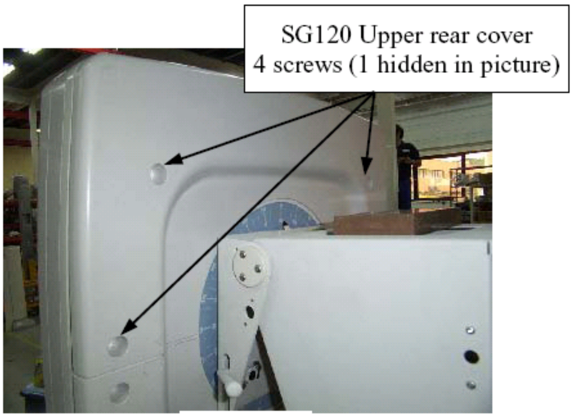
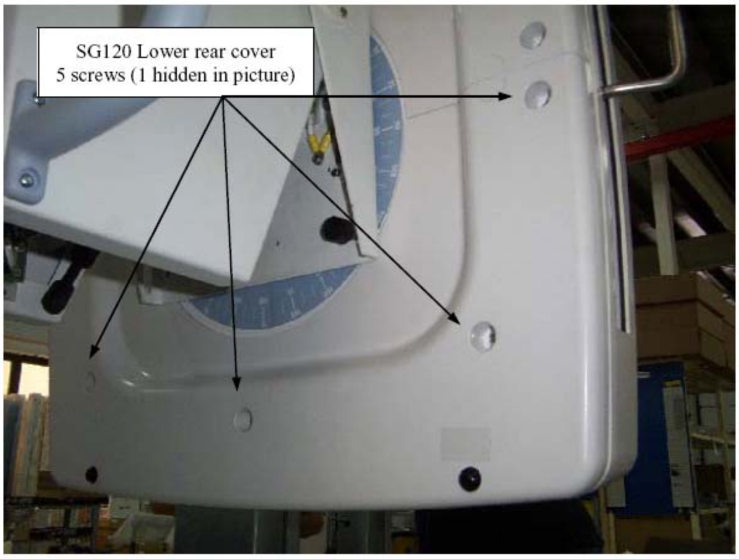
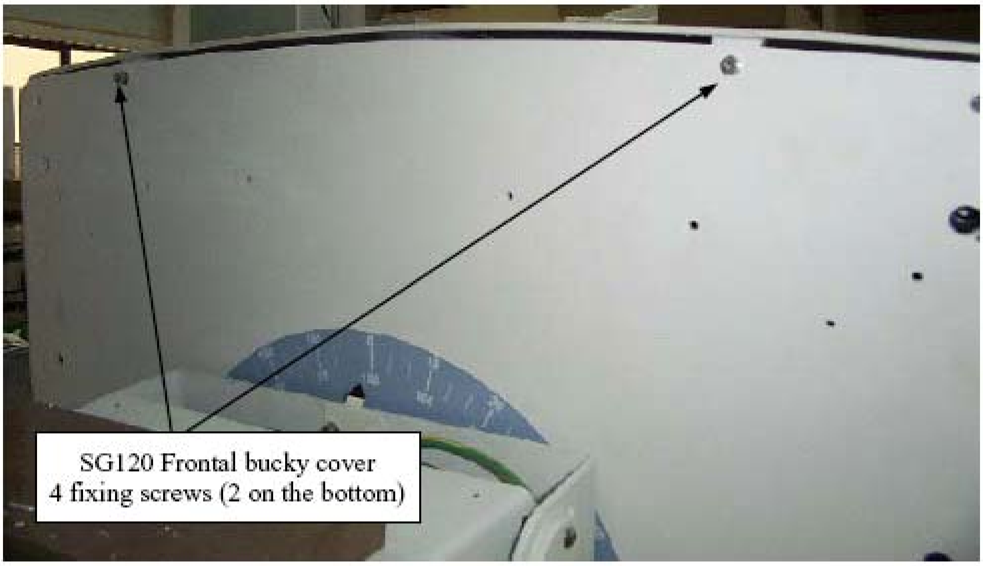
***Note:** To disassembly the different bucky covers, loosen the screws shown below.*


SG120 Upper rear cover
4 screws (1 hidden in picture)


SG120 Lower rear cover
5 screws (1 hidden in picture)


SG120 Frontal bucky cover
4 fixing screws (2 on the bottom)

b. Connect the ground cable to the ground stud on the bucky control board.

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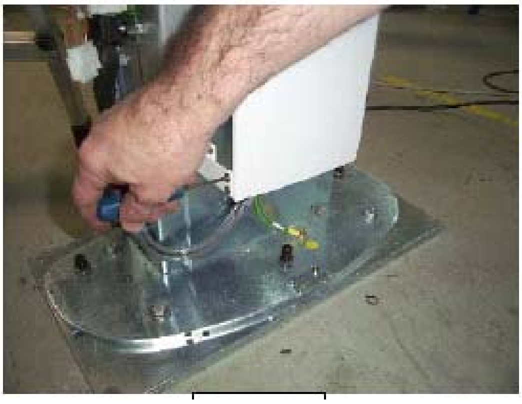
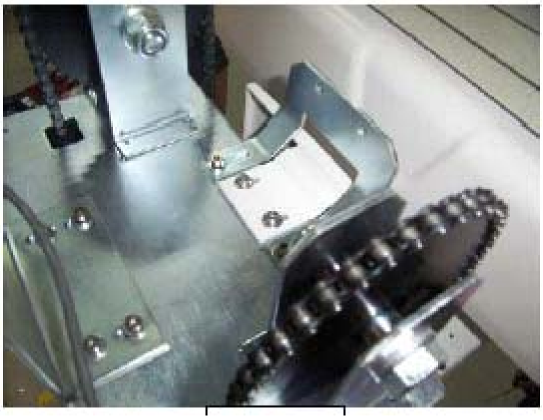
2) Column covers
   The column frontal cover is assembled at factory. If you need to disassembly it, follow the next procedure:

   a. Remove the screws (4 in total, 2 on each side) fixing the cover to the squares at the bottom of the column.



   b. Remove the 2 screws fixing the cover to the top of the column.



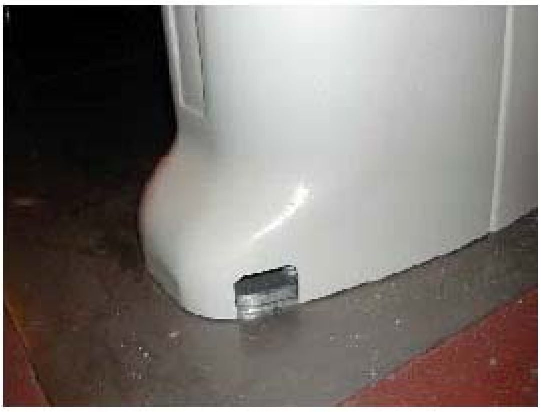
   c. Move the bucky carriage assembly to the lowest position and remove the front cover with care.

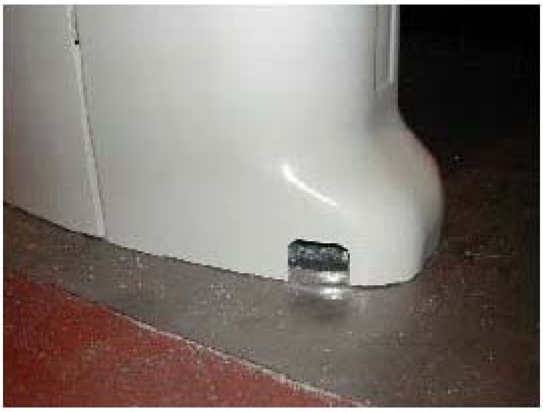
The column lateral and top covers are supplied disassembled into the packing box.

The procedure to assembly the lateral and top covers follows:

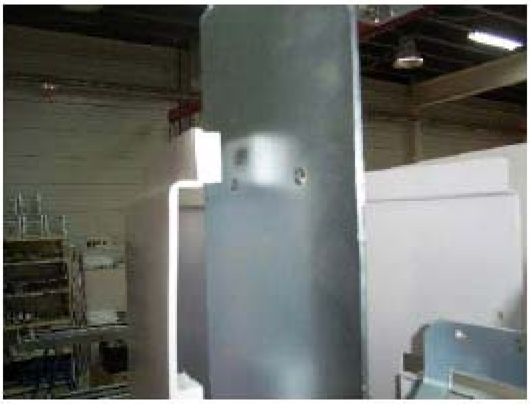
a. Make sure the column front cover is assembled.

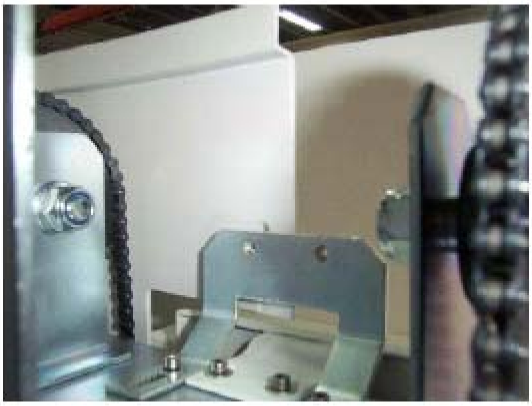
b. Cut the pre-cut window for system cables entrance located on the rear side of one of the lateral covers, depending on the side from where the system cables entrance needs to be made in your installation.



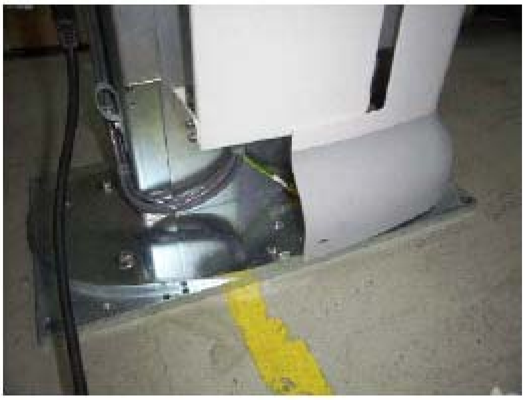


c. Assembly one of the lateral covers (2 screws) to the plate located on the column top.





d. Fix the lateral cover to the square located on the foot of the column (1 screw).



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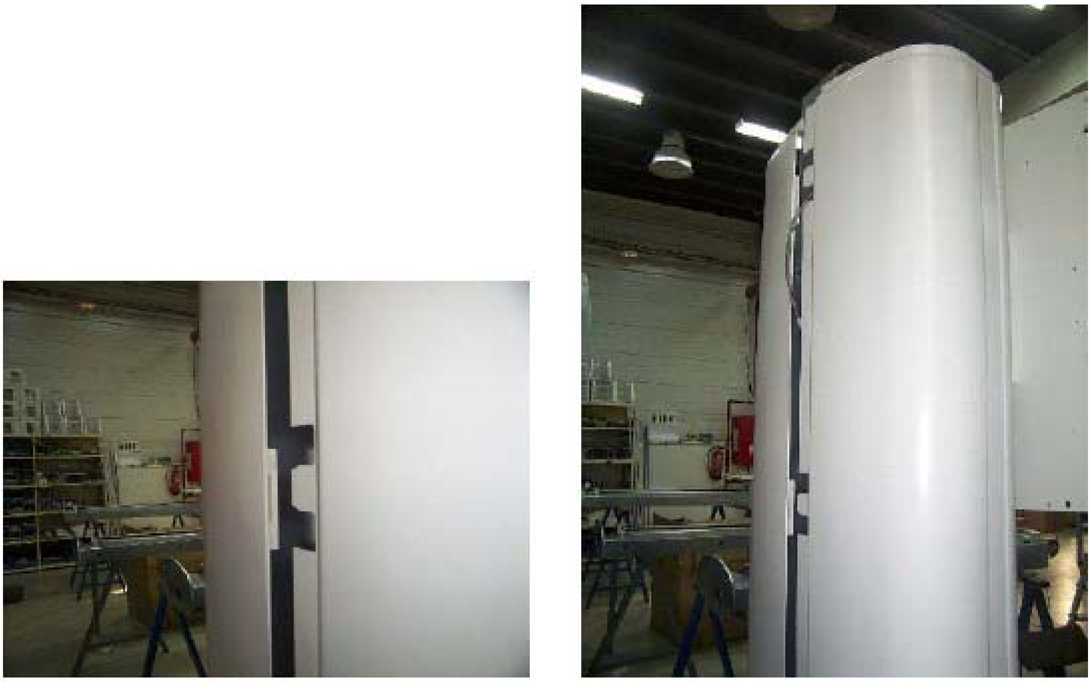
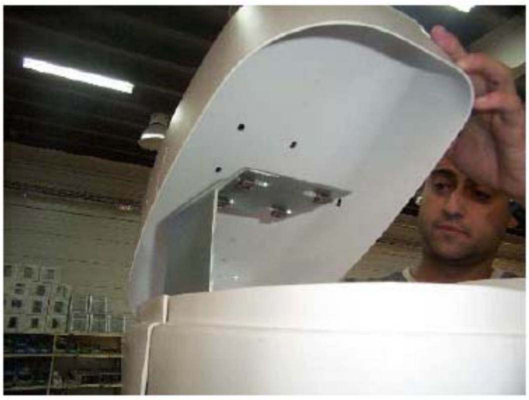
e. Take the second cover and make it fits with the cover already assembled.

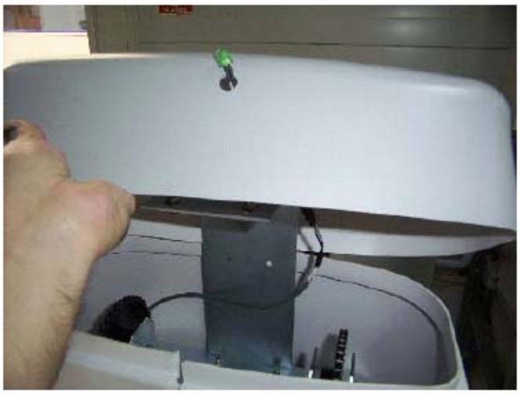


f. Fix the second lateral cover to the top and foot of the column (steps b and c).

g. Connect the ON/OFF led cable supplied with the equipment and assembly the top cover (4 screws) to the plate on the top of the column.

Note: Some of the holes to fix the covers have some safe clearance enabling to adjust the assembly in the best conditions.





PROTEUS XR/A WALL STAND	20/22	IST 009

12. Rotation limit screw

    a. Localize the Switches S2-1 and S2-2 behind the back bucky support. See Figure Switches S2-1 & S2-2 localization.

    b. Loose the S2-1 screws 1, 2, 3 (Figure Switch S2-1) with an Allen wrench number 3.

    c. Loose the Limit rotation Screw with an Allen wrench number 4.

    d. Take apart the Limit rotation Screw and put in the original position the Switch S2-1 by tighten the S2-1 screws 1, 2, 3.

    e. Loose the S2-2 screws 1, 2, 3 (Figure Switch S2-2 & Screws) with a Allen wrench number 3.

    f. Tight the Limit rotation Screw (Allen wrench number 4).

    g. Put the Switch S2-2 in the original position by tighten the S2-2 screws 1, 2, 3.

Note: In Figure Switch S2-2 & Screws and Figure Switch S2-1 are shown the switch S2-1 & S2-2 without the microswitch only for clarification. Do not touch the electronic component. Only is necessary to loose the screws as follows.

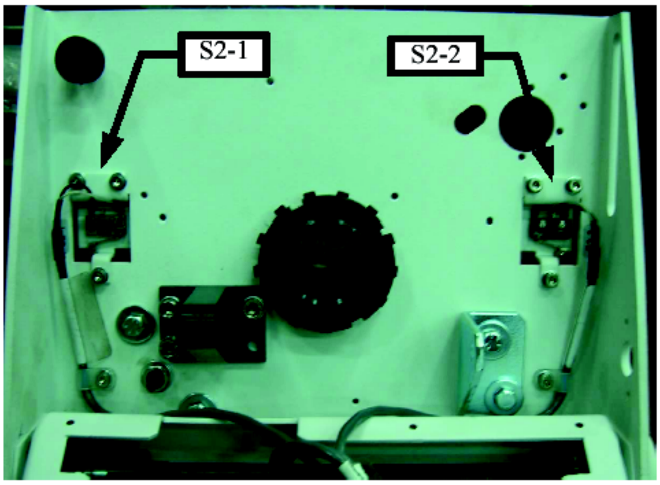


Figure Switches S2-1 & S2-2 localization

Note: Not to change this screw will cause that cassette tray falls when rotating.

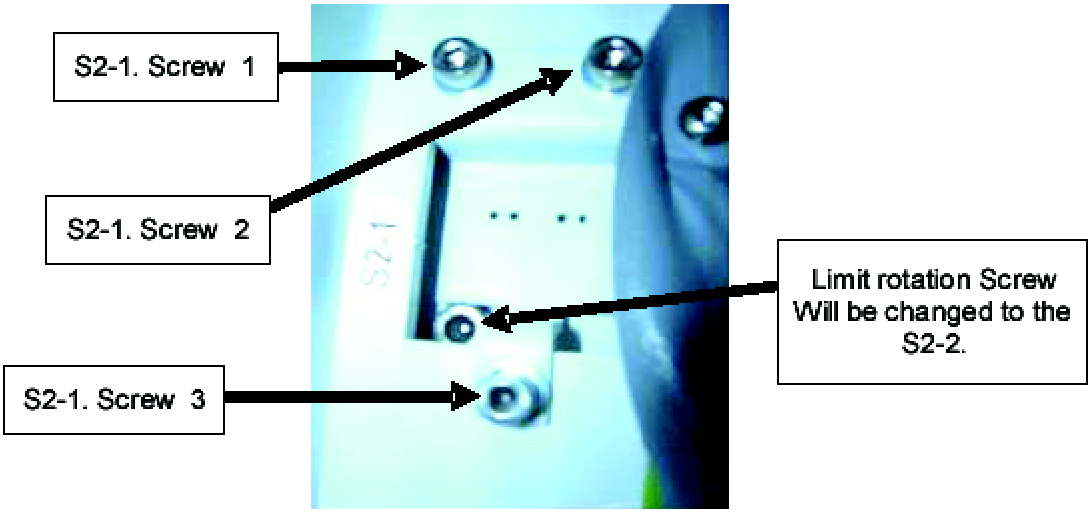

S2-1. Screw 1
S2-1. Screw 2
S2-1. Screw 3
Limit rotation Screw Will be changed to the S2-2.
S2-1

Figure Switch S2-1

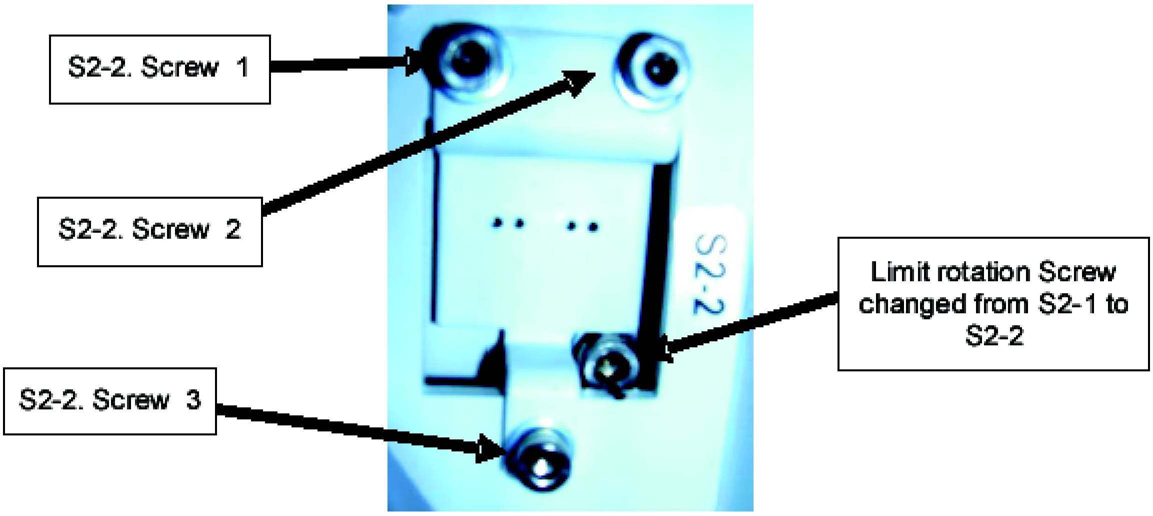

S2-2. Screw 1
S2-2. Screw 2
S2-2. Screw 3
Limit rotation Screw changed from S2-1 to S2-2
S2-2

Figure Switch S2-2 & Screws

WARNING

THE LIMIT ROTATION SCREW SHOULD BE AT S2-1 WHEN LEFT HAND CONFIGURATION, AND AT S2-2 WHEN RIGHT HAND. IN OTHER CASE THE ROTATION (SEE FIGURE LEFT CONFIGURATION AND FIGURE RIGHT CONFIGURATION IN SECTION 5-3-3-3) WILL BE DONE IN THE WRONG WAY AND THE CASSETTE TRAY WILL SLIP WHEN ROTATING. HEEDING THIS WARNING MAY CAUSE INJURY TO THE OPERATOR.

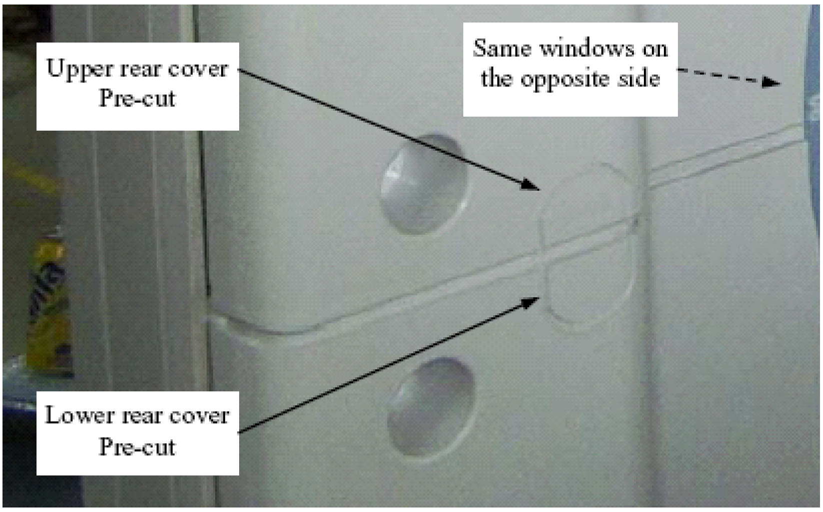
PROTEUS XR/A WALL STAND	**22/22**	**IST 009**

13. Covers for patient support option installation

Note: This item is applicable only if the patient support option kit is going to be installed. See IST025 of this chapter.

In case the patient support option is going to be installed, the next procedure has to be followed for NBS2100 covers:

a. Remove the back covers of the bucky support assembly.
b. Cut the pre-cut windows of the lower rear cover lodging the patient handgrips. Leave the cover ready for further assembly.



c. Take the upper rear cover included in patient support option kit.
d. Cut the pre-cut windows of the upper rear cover (the one chosen in previous step) lodging the patient handgrips. Replace the old upper rear cover by this new cover and leave it ready for further assembly.
e. Discard the old upper rear cover.
f. Follow the procedure described in IST025 of this chapter, referring to installation of patient support option.
g. Assembly the new upper and lower rear covers.

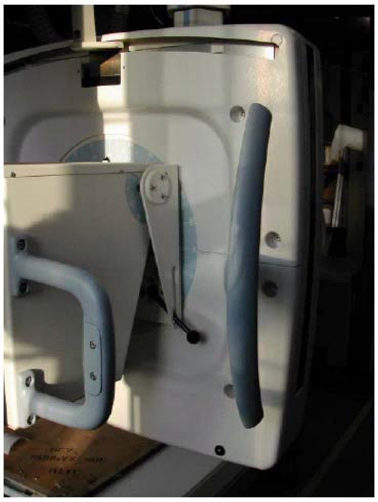


Figure: Look of rear bucky covers with Patient Support OPTION installed

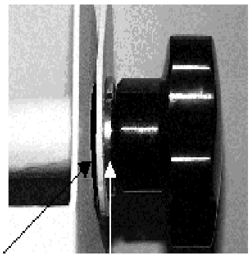
PROTEUS XR/A			**1/7**	**IST 010**
Subassembly: **Mount System Console and Printer**				
Purpose: Installation Procedure			*Version no.* 1 *Date:* **02/05/01**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

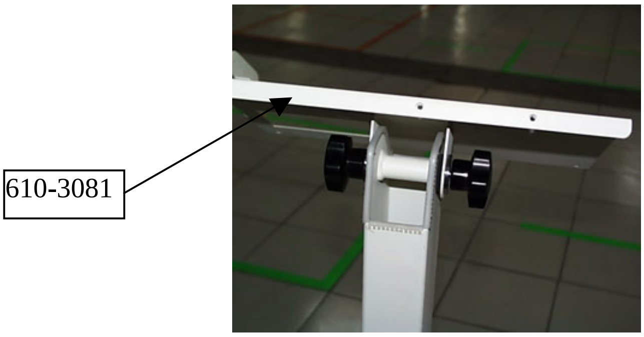
Note: There are three types of mounting available for each system. You should choose one according to the system configuration and customer's requirement.

Note: Connect the cables according to the job card IST 020.

1. Console with Pedestal

1-1 Mount the console plate (610-3081) on the console pedestal.



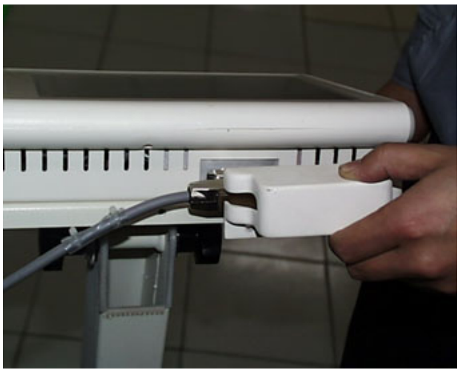


1-2 Mount the system console on the console plate and fasten with the former screws.

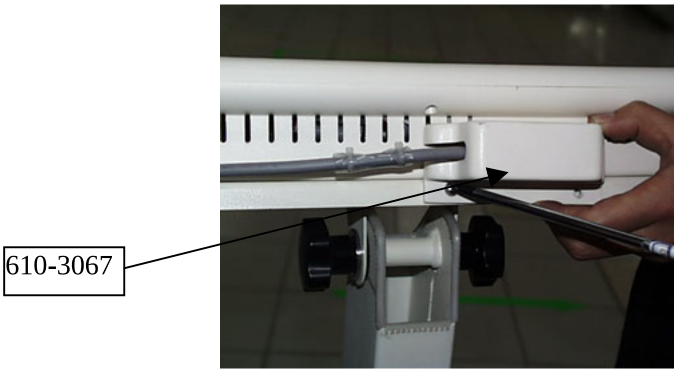
1-3 Mount Hand Switch holder with the two screws.

1-4 Connect console and cable.

Note: ***When you plug the console cable, make sure lock the connector securely.***



1-5 Mount Connecting Cover (610-3067).

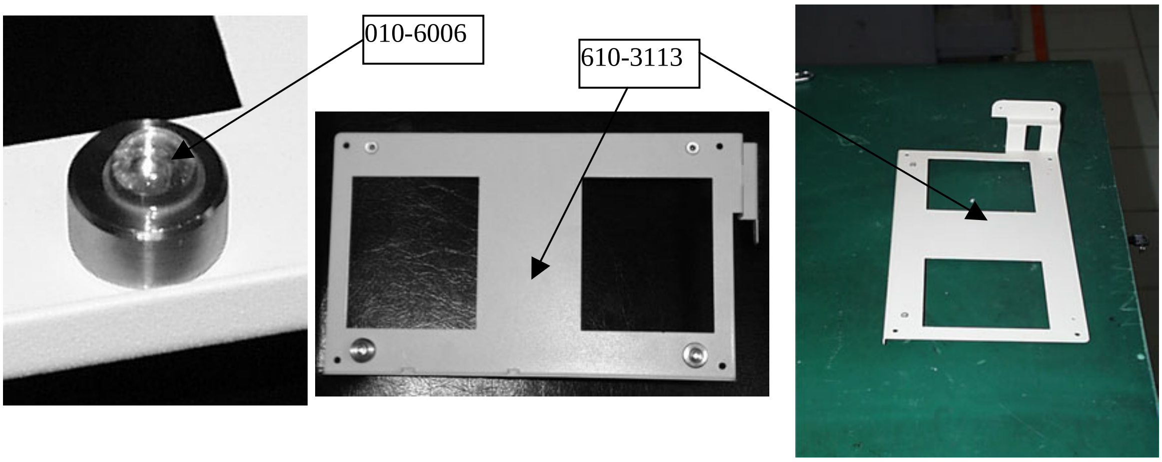


2. Console on the desktop

Note: There are tow choices to place console on the desktop.

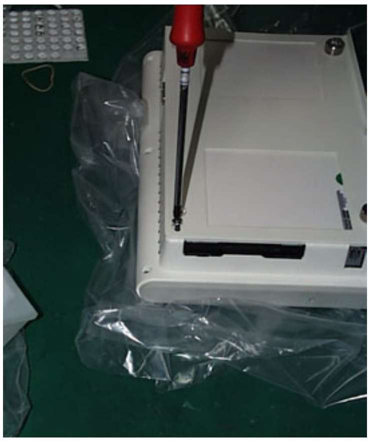
2-a Only console on the desktop

2-a-1 Please select the Plug Cover Fixer (610-3113), shown as the pictures below.

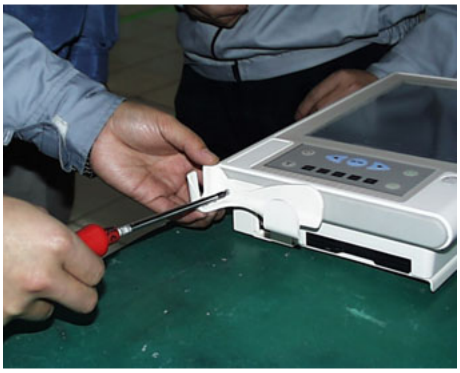


2-a-2 Mount the part 610-3113 to the console.

Note: Console Surface PROTECTION!



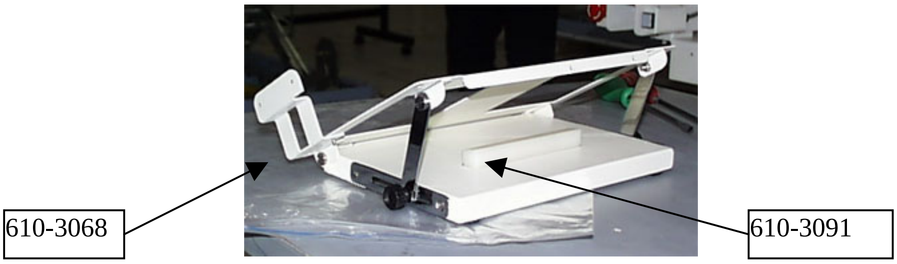
2-a-3 Follow the steps 1-3,1-4,1-5.



2-b Console on the desktop with a bracket

2-b-1 Assemble Connecting Board (610-3091), Hand Switch Fixing Plate (610-3068) and Bracket.

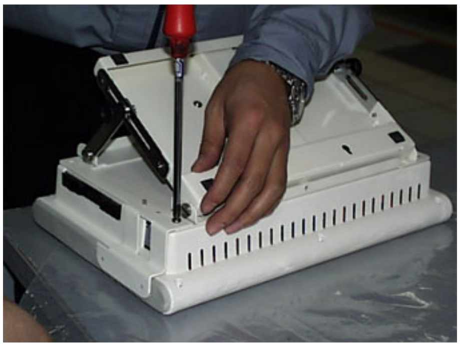
Note: There are two choices to assemble 610-3068 and 610-3091 according to either the table or the wall you choose to mount them on.



PROTEUS XR/A	4/7	IST 010

2-b-2 Mount the assembly to console.

Note: Console Surface PROTECTION!

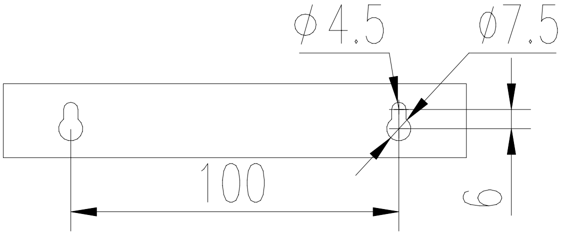


2-b-3 Follow the steps 1-3,1-4,1-5.

3. Console mounted on the wall

3-1 Mark the mount holes onto wall using the bracket.

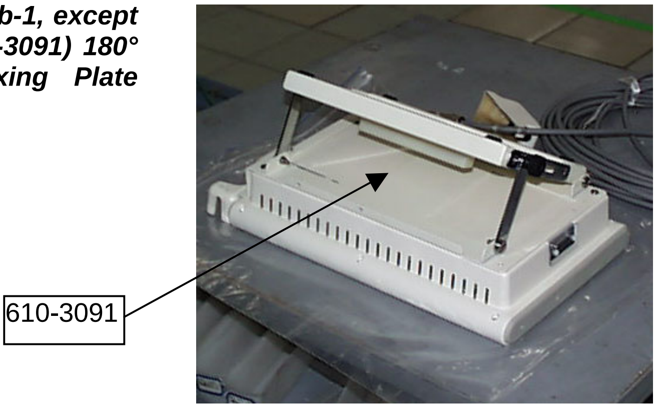
3-2 Drill two holes, and insert two M4 expanding bolts into the wall.



3-3 Assemble Connecting Board (610-3091), Hand Switch Fixing Plate (610-3068) and Bracket.

Note: The step is the same as the step 2-b-1, except turning the connecting board (610-3091) 180° and changing Hand Switch Fixing Plate (610-3068) placement.

Note: Console Surface PROTECTION!



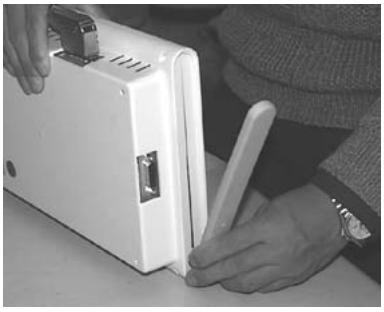
3-4 Follow the steps 1-3,1-4,1-5.

3-5 Hang the bracket and console onto the bolts on the wall.

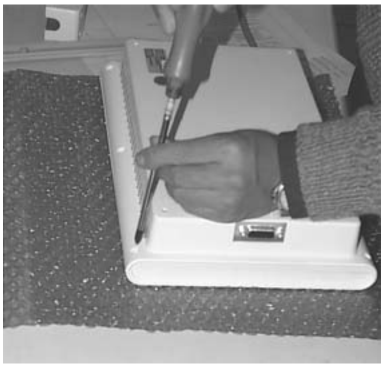
PROTEUS XR/A	6/7	IST 010

A printer is an optional component. Mount a system console with a printer follows the steps below.

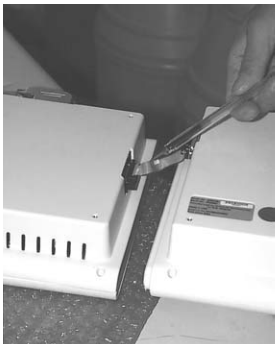
1. Remove the side cover from the system console.



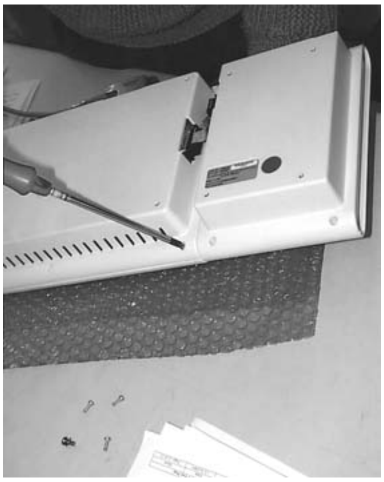
2. Loosen or remove the screws.



3. Connect the system console and the printer with a cable.

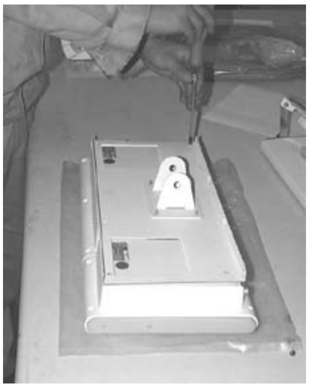


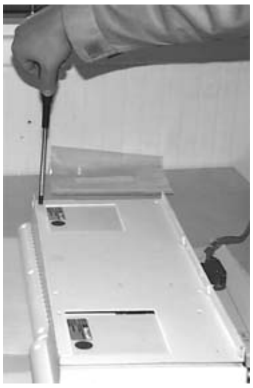
4. Insert the printer into the system console.
5. Tighten the screws



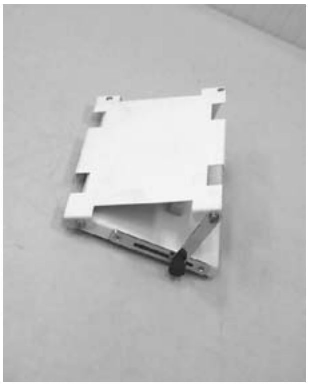
6. Mount a console plate.

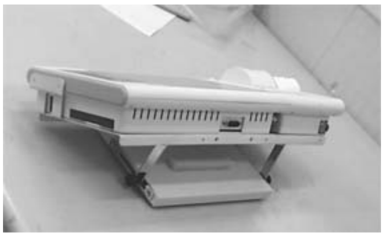
Note: ***Choose a proper console plate according to customer's requirement.***
If a table top mounting is chosen, follow the step7, 8, 10, 11, 12.
If a pedestal mounting is chosen, follow the step9, 10, 11, 12.





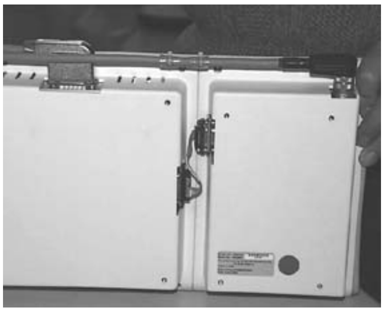
7. Assemble the bracket for table top mounting.
8. Mount the printer to the bracket.



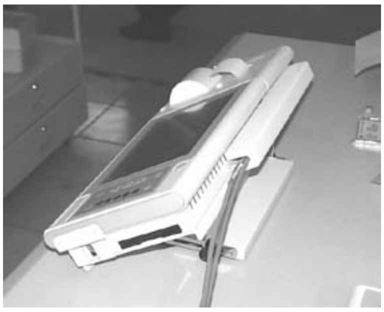


9. Mount the printer to the pedestal, see step 1-1.

10. Insert the cable connector into the socket.



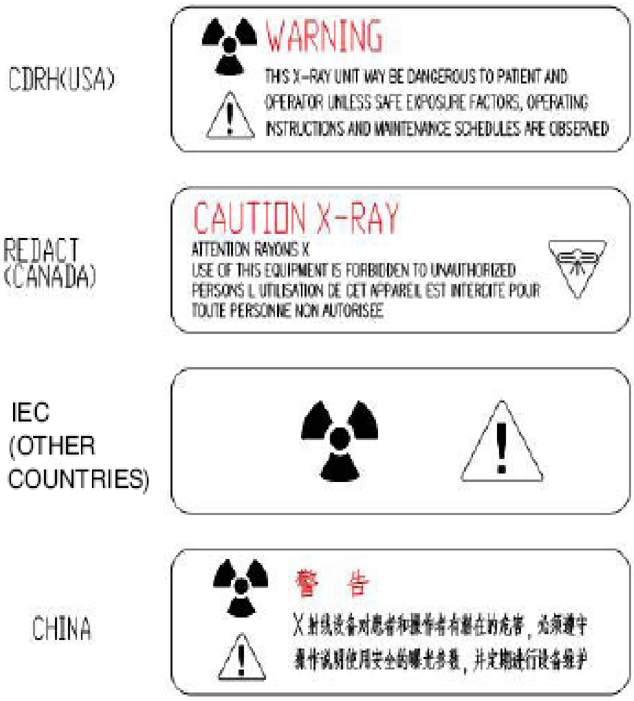
11. Mount the cable cover.
12. Follow the steps 1-3,1-4,1-5.



PROTEUS XR/A			**1/2**	**IST 011**
Subassembly: **Warning Signs and Labels**				
Purpose: Installation Procedure			*Version no.* 2 *Date:* **10/10/06**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	From / / *To / /*	*From* *To*	*Time:* **2min**	

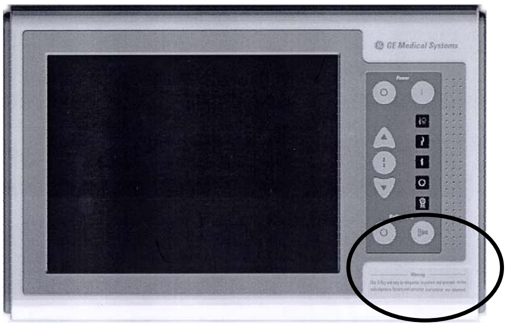
Warning Signs and Labels

Note: ***There four types of warning labels are delivered as accessories in "OPEN ME FIRST" box.***


CDRH(USA)
WARNING
THIS X-RAY UNIT MAY BE DANGEROUS TO PATIENT AND OPERATOR UNLESS SAFE EXPOSURE FACTORS, OPERATING INSTRUCTIONS AND MAINTENANCE SCHEDULES ARE OBSERVED
REDACT (CANADA)
CAUTION X-RAY
ATTENTION RAYONS X
USE OF THIS EQUIPMENT IS FORBIDDEN TO UNAUTHORIZED PERSONS L UTILISATION DE CET APPAREIL EST INTERDITE POUR TOUTE PERSONNE NON AUTORISEE
IEC (OTHER COUNTRIES)
CHINA
警 告
X射线设备对患者和操作者有潜在的危害，必须遵守操作说明使用安全的曝光参数，并定期进行设备维护

PROTEUS XR/A	**2/2**	**IST 011**

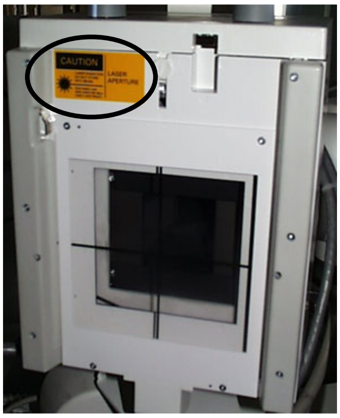
PROTEUS XR/A SYSTEM LABELS LOCATION

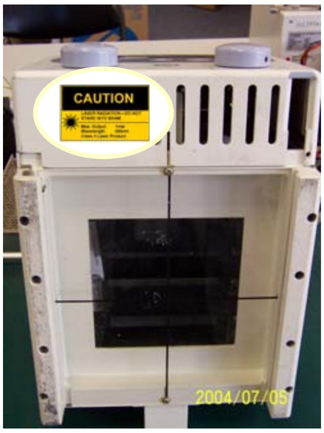

GE Medical Systems
Power

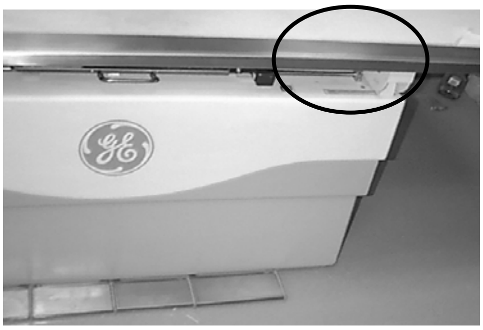
Note: Please select the appropriate warning label to affix it on the right bottom of console.

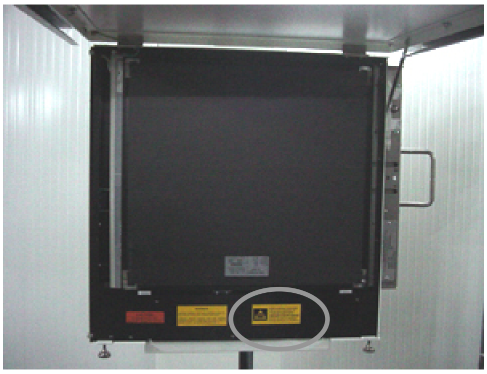
WARNING

WARNING LABELS SHOULD BE INCLUDED IN "OPEN ME FIRST" BOX. IF THEY ARE MISSING, PLEASE ORDER A NEW CONSOLE (2259976) IN CONFORMITY WITH REGULATION REQUIREMENTS.


CAUTION
LASER APERTURE


CAUTION
2004/07/05





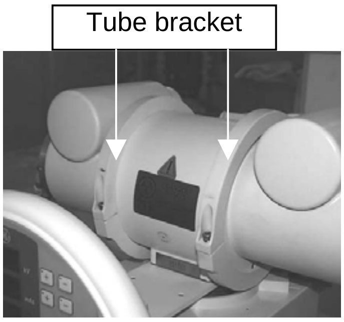
PROTEUS XR/A			**1/1**	**IST 012**
Subassembly: **Mount RAD 14,21 X-ray Tube**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

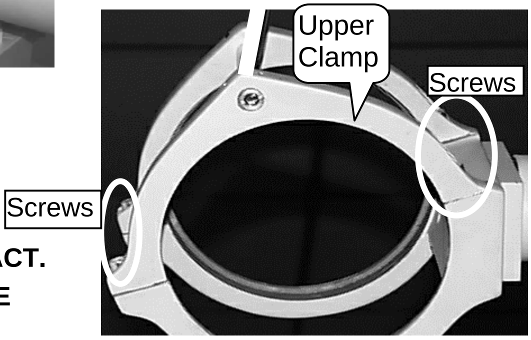
Note: This Job Card is only for RAD14,21 X-ray tube. For the assembling of MX100 X-ray tube, please refer to Job Card IST 013 in this Chapter.

1. Assemble tube bracket. Put the blue cover onto handle if it is not assembled.

Note: Apply locktite to mount screws.

Note: For RAD 21 X-ray tube, there is no trunion handle.

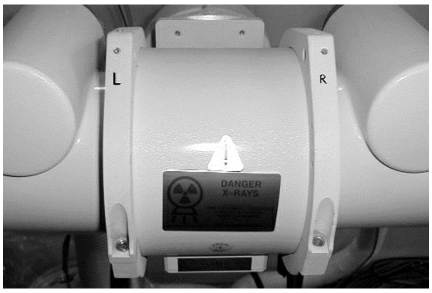




2. Loosen the four screws of the upper clamp of tube bracket.
3. Remove the upper clamp of tube bracket.

WARNING

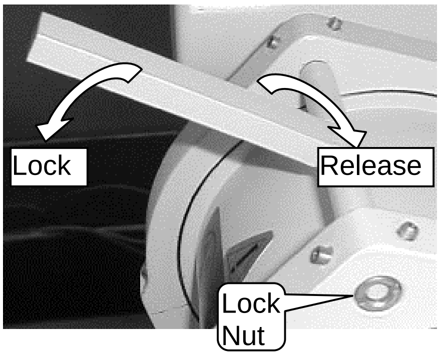
TO PREVENT THE CLAMPS FROM ANY IMPACT. IN CASE IMPACT OCCURRED, IT SHOULD BE VERIFIED THAT THE CLAMP HAS ENOUGH STRENGTH BEFORE INSTALLATION.



4. Put the X-ray tube on lower support of tube bracket.
5. Reinstall the upper clamp of tube bracket. Tighten four screws surely.

Note: Pay attention to the marks on the clamps to put the left and right clamps into proper position.

The torque applied to the four screws is 6.0~6.4 N.m.



6. Tube bracket has a trunion used to rotate the tube. Loosen the two set screws and then adjust the lock nut on both sides of the tube clamp. Make it lock the tube when moving the trunion forward and release the tube otherwise.
7. Fasten the set screws again.

Note: For RAD 21 X-ray tube, there is no trunion handle, you just need to fasten clamp screws.

PROTEUS XR/A			**1/2**	**IST 013**
Subassembly: **Mount MX100 X-ray Tube**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **03/01/03**	
NF No.	*Production date*	*Serial No.*	*Personnel:2*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

***Note:* This Job Card is only for MX100 X-ray tube. For the assembling of RAD14, 21 X-ray tube, please refer to Job Card IST 012 in this Chapter.**

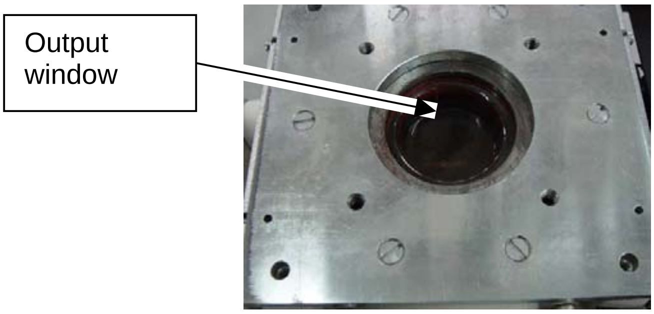
1. Assemble the lead cup (GPCP No.: 2379458) to the MX100 X-ray tube output window if the lead cup is not attached before arrival at the install site.

WARNING

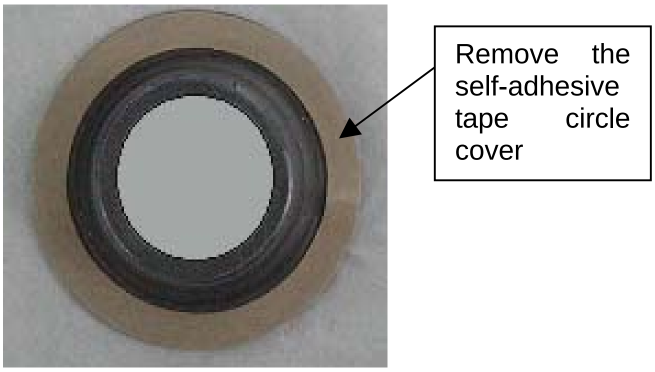
BECAUSE OF THE POSSIBILITY OF IMPAIRMENT TO HUMAN HEALTH, PLEASE PAY ATTENTION TO WEAR GLOVES AND PREVENT THE DIRECT CONTACT WITH HUMAN BODY WHEN CARRYING OR ASSEMBLING THE LEAD CUP.

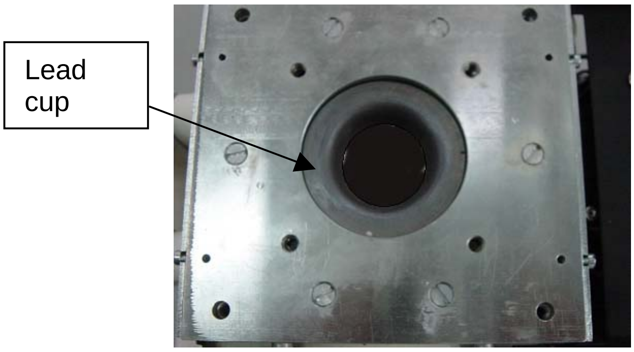
***Note:* The lead cup should only be applied with MX100 X-ray tube (GPCP No.: D2301R) and Auto collimator GPCP No. 2259298-54 (or Manual collimator GPCP No. 2259989). Do not use Lead cup with X-ray tubes or collimators of any other types, such as RAD14,21 X-ray tubes.**

1) Clean the output window cover of MX100 tube.



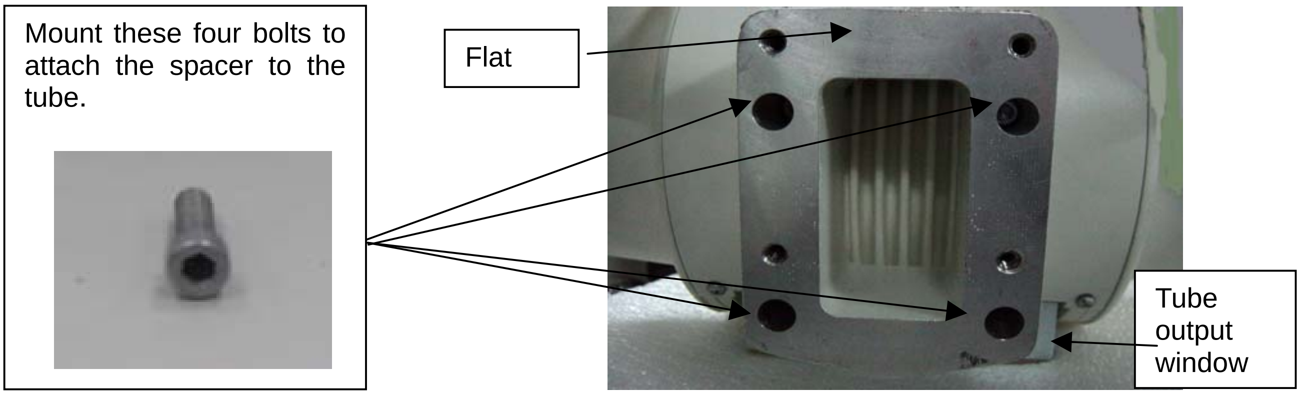
2) Remove the self-adhesive tape circle cover from the lead cup and attach the lead cup onto the output window cover of MX100 tube. Apply pressure to attach tightly and ensure the fixation.





PROTEUS XR/A	**2/2**	**IST 013**

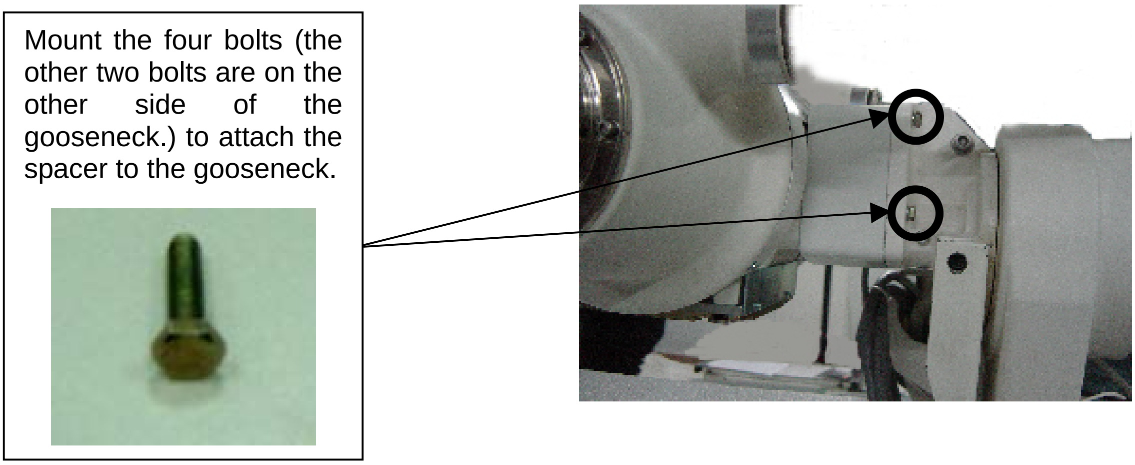
2. Attach the spacer to the tube as shown in illustration below with four hexagon socket head bolts (GPCP No.: 46-170498P11, see illustration). Apply locktite to each bolt. The flat side must be away from the tube output window.


Mount these four bolts to attach the spacer to the tube.
Flat
Tube output window

Note: Apply locktite to mount screws to ensure the firmly tube assembling.

CAUTION **Pay attention to the mounting direction of spacer. The flat side must be away from the tube output window.**

3. Position the tube with spacer attached as shown in illustration below and secure them to the gooseneck with four hexagon head bolts (GPCP No.: 001-4060-03, see illustration.). Apply locktite to each bolt.

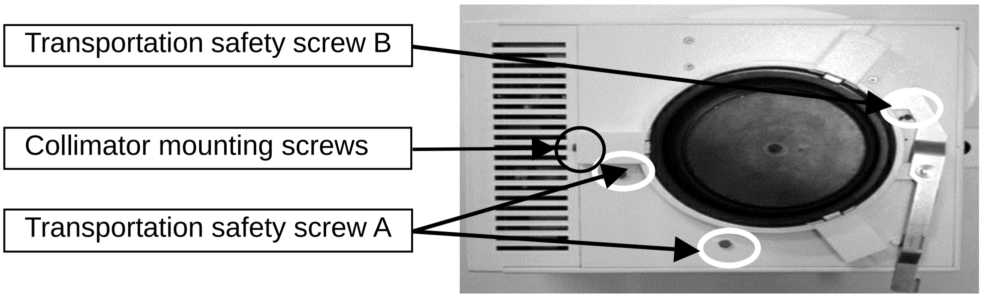

Mount the four bolts (the other two bolts are on the other side of the gooseneck.) to attach the spacer to the gooseneck.

<table>
<tr><td colspan="3">PROTEUS XR/A</td><td>1/3</td><td>IST 014</td></tr>
<tr><td colspan="5"><i>Subassembly:</i> Mount Proteus XR/a Collimator to RAD 14,21 X-ray Tube</td></tr>
<tr><td colspan="3">Purpose: Installation Procedure</td><td colspan="2"><i>Version no.</i> 2
<i>Date:</i> 20/6/06</td></tr>
<tr><td><i>NF No.</i></td><td><i>Production date</i></td><td><i>Serial No.</i></td><td colspan="2"><i>Personnel:2</i></td></tr>
<tr><td></td><td><i>From / /</i>
<i>To / /</i></td><td><i>From</i>
<i>To</i></td><td colspan="2"><i>Time:</i> 20min</td></tr>
</table>

Note: ***This Job Card is only for RAD 14,21 X-ray tube. For the mounting of Proteus XR/a Collimator to MX100 X-ray tube, please refer to Job Card IST 015 in this Chapter.***

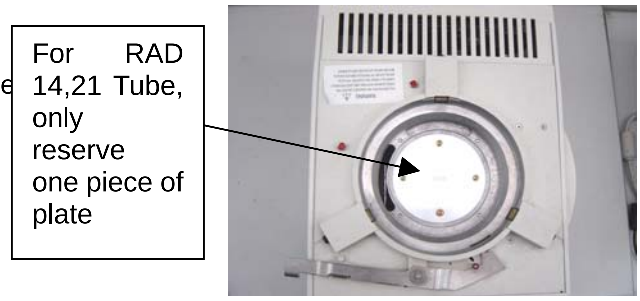
Note: ***For Manual Collimator, the transformer on OTS also needs replaced for proper lamp power supply, please refer to Job Card IST002 and OTS service manual, after the collimator installation, please refer to CAL 015 to calibrate lamp voltage.***

1. Remove the three safety screws with red heads from the collimator (marked with white ellipses).


Transportation safety screw B
Collimator mounting screws
Transportation safety screw A

2. Check collimator aluminium plate quantity,if the collimator has two pieces of plates installed, remove one and reserve only one piece of plate for RAD14,21 tube

Note: ***This action in step 2 is only for RAD14,21 Tube. For MX100 Tube, do not remove any of the Aluminium plate. (Refer to Job Card 015)***



3. Loosen the three collimator mounting screws to their maximum permissible limit.

CAUTION

Remove all 3 transportation safety screws (marked with white ellipses), see illustration A and B, before applying power to the collimator.

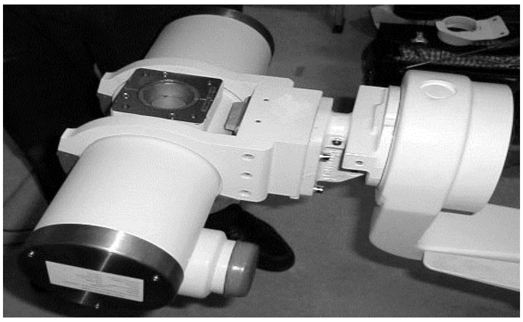
Before transportation tighten the transport safety screws A fully (they have to screw in easily). Therefore the smallest x-ray field has to be set. For manual setting of the collimator blades replace the left cover and adjust an opening of the collimator blades of approx. 4.5 mm.

Turn off voltage before fitting or removing the cover.

Mind installation instructions and ESD regulations.

PROTEUS XR/A	2/3	IST 014

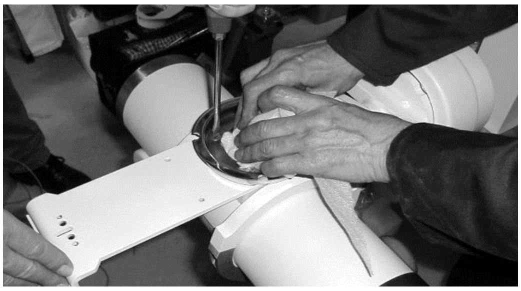
4. Rotate the tube 180°.



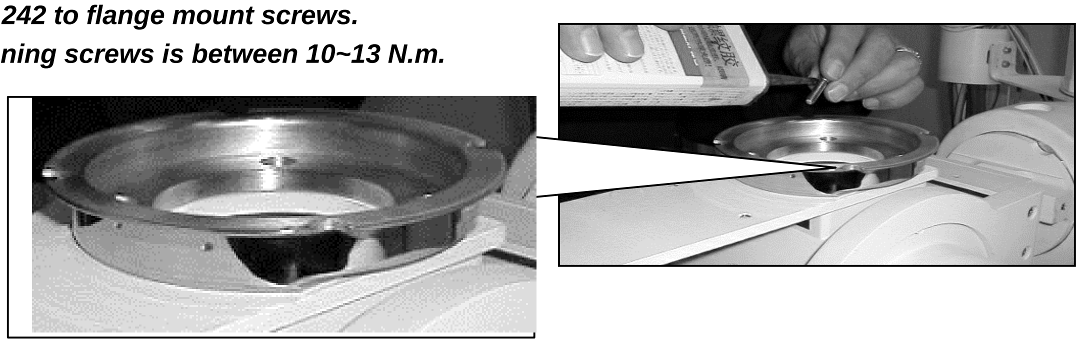
5. Mount the collimator mounting flange and the OTS console bracket with four provided screws.

Note: If the flange has been mounted in the factory, skip this step.

WARNING **USE SOME MATERIAL TO PROTECT TUBE WINDOW WHEN FASTENING SCREWS. PAY ATTENTION TO THE DIRECTION OF FLANGE. THE SLOT SHOULD BE ALIGNED WITH OTS CONSOLE BRACKET.**



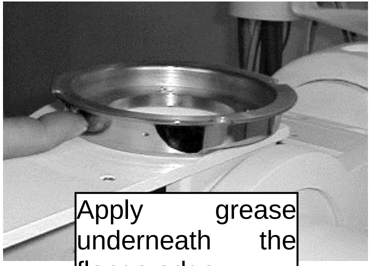
Note: Apply locktite 242 to flange mount screws.
The force fastening screws is between 10~13 N.m.



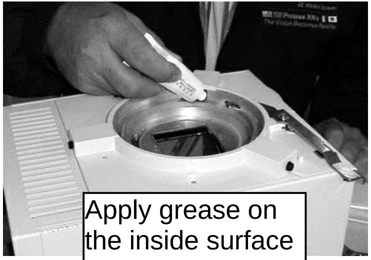
6. Be careful not to damage the collimator fingers. Position the collimator on the X-ray tube. Be sure the detent lever is not preventing the collimator from seating fully.

CAUTION **The collimator rotation lever must be fully depressed when mounting/installing the collimator to the mounting flange. Failure to do so could cause the collimator to mount improperly and fall from the unit.**

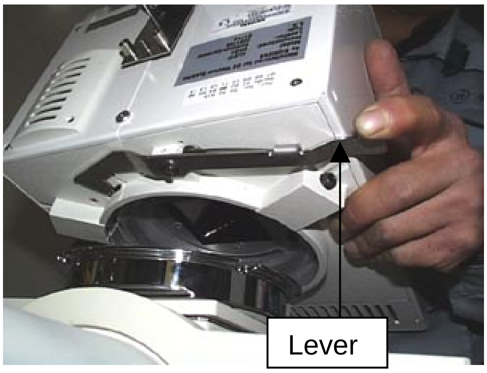
Note: Apply grease supplied to collimator mount flange and collimator adapter for easy movement.



Apply grease underneath the flange edge

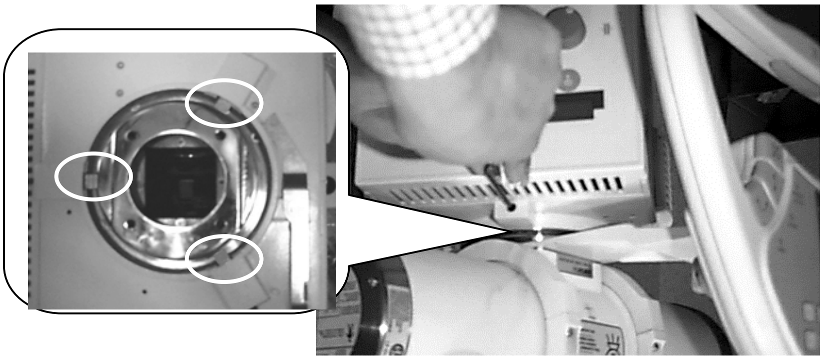


Apply grease on the inside surface of adapter



PROTEUS XR/A	3/3	IST 014

7. Tighten the 3 collimator mounting screws in equal number of turns until they lock securely and can not be turne anymore. Then back out each screw equally by maximum 1/2 turn, so that collimator can rotate freely. Verif that when the collimator is not in a detent location, the minimum rotate force is 20N.



8. Turn the X-ray tube back into normal position.

WARNING

CHECK THAT THE MOUNTING IS CORRECT BEFORE TURNING THE TUBE BACK TO NORMAL POSITION.

BE SURE THAT THREE THRUST BUSHINGS ARE SYMMETRIC TO THE CENTER AND HOLD THE FLANGE FIRMLY.

9. Loosen the X-ray tube. Use level gauge to check that the tube and collimator are in level position, and then fasten the tube using trunion handle securely.

Note: ***For RAD 21 X-ray tube, there is no trunion handle.***
Just need to fasten clamp screws.
Apply locktite to mount screws.

10. Mount the OTS Console.

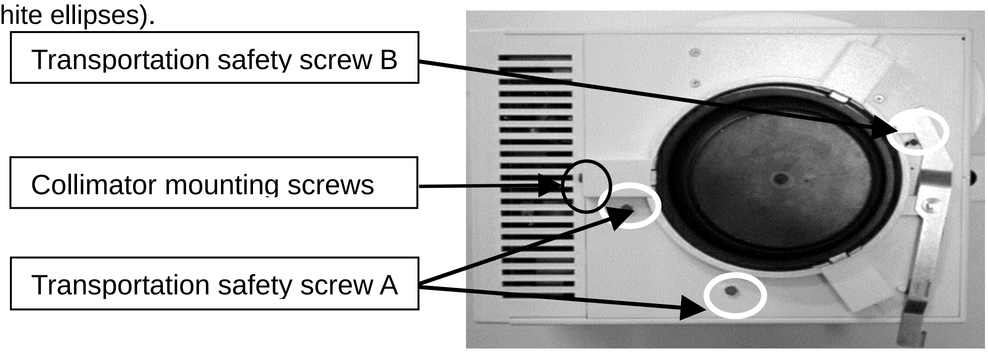
PROTEUS XR/A			**1/4**	**IST 015**
Subassembly: **Mount Proteus XR/a Collimator to MX100 X-ray Tube**				
Purpose: Installation Procedure			*Version no.* 3 *Date:* **15/12/06**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

Note: If the Proteus XR/a collimator is replaced with Eclipse Proteus Collimator unit, remove the lead cup on tube side before new collimator installation.

Note: For Manual Collimator, the transformer on OTS also needs replaced for proper lamp power supply, please refer to Job Card IST002 and OTS service manual, after the collimator installation, please refer to CAL 015 to calibrate lamp voltage.

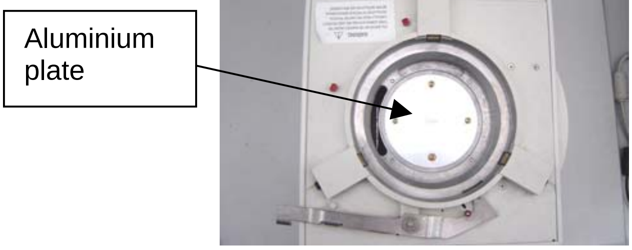
Note: This Job Card is only for MX100 X-ray tube. For the mounting of Proteus XR/a Collimator to RAD 14,21 X-ray tube, please refer to Job Card IST 014 in this Chapter.

1. Remove the three safety screws with red heads from the collimator (marked with white ellipses).


Transportation safety screw B
Collimator mounting screws
Transportation safety screw A

2. Check the collimator aluminum plate quantity, if there is only one plate in the collimator-tube interface, please order one plate 2383309. Make sure there are two plates installed on the collimator-tube interface.

Note: This action in step 2 is only for the MX100 Tube.
For RAD14,21 Tube, only reserve one piece of Aluminium plate.
(Refer to Job Card IST 014)



3. Loosen the three collimator mounting screws to their maximum permissible limit.

CAUTION

Remove all 3 transportation safety screws (marked with white ellipses), see illustration A and B, before applying power to the collimator.

Before transportation tighten the transport safety screws A fully (they have to screw in easily). Therefore the smallest x-ray field has to be set. For manual setting of the collimator blades replace the left cover and adjust an opening of the collimator blades of approx. 4.5 mm.

Turn off voltage before fitting or removing the cover.

Mind installation instructions and ESD regulations.

PROTEUS XR/A	2/4	IST 015

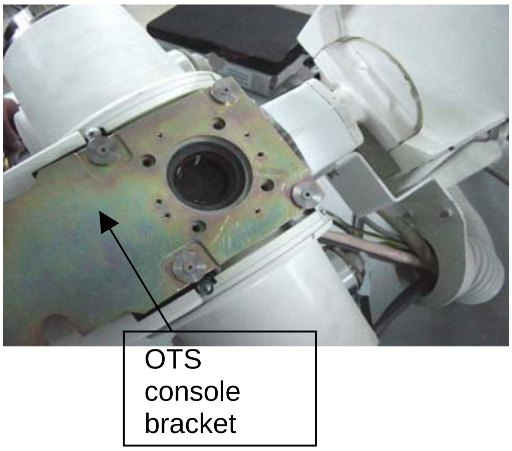
4. Rotate the tube 180°.

Note: Step 4 to 5 should be performed only when the OTS console bracket and collimator interface plate are not assembled with the MX100 X-ray tube when arriving at the install site. Otherwise, if the OTS console bracket and collimator interface plate are already assembled at the factory, skip to step 6 directly.

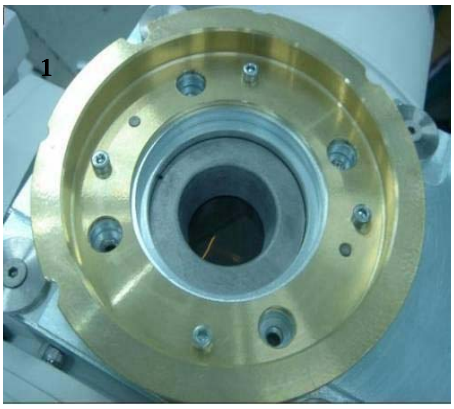
5. Mount the OTS console bracket.

Note: Apply locktite to OTS console bracket mount screws when mounting.

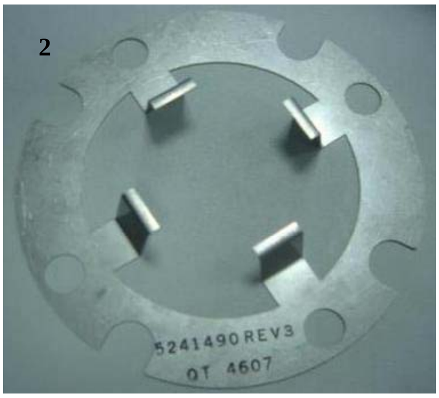
6. Mount the tube/collimator interface plate.



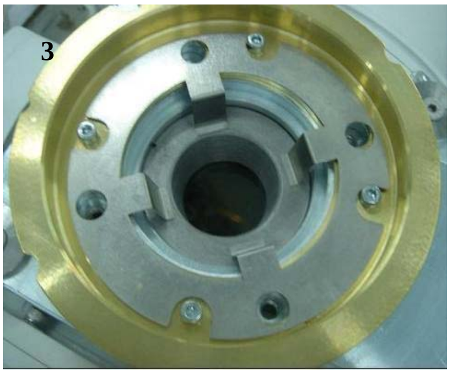
WARNING **USE SOME MATERIAL TO PROTECT TUBE WINDOW WHEN FASTENING SCREWS.**
PAY ATTENTION TO THE DIRECTION OF PLATE. THE SLOT SHOULD BE ALIGNED WITH OTS CONSOLE BRACKET.



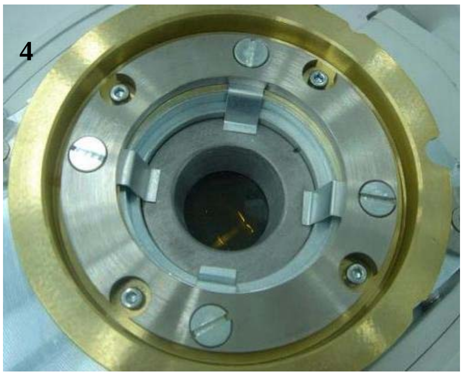
1. Mount collimator ring



2. CONE RETAINER 5241490



3. Put CONE RETAINER to the surface



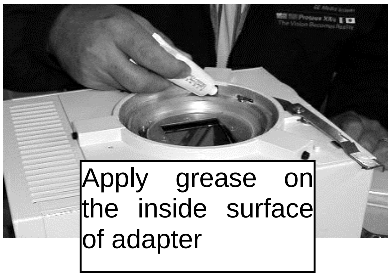
4. Fix the CONE RETAINER

Note: Apply LOTITE 242 to 8 screws.

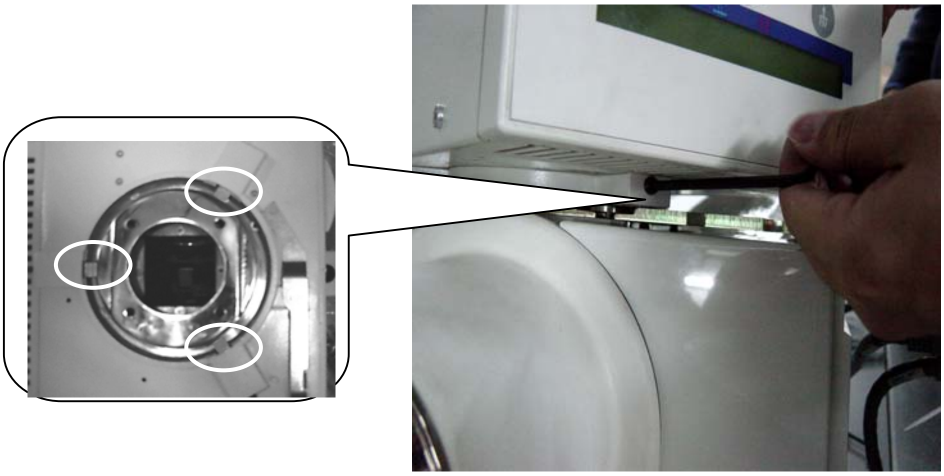
7. Be careful not to damage the collimator fingers. Position the collimator on the X-ray tube. Be sure the detent lever is not preventing the collimator from seating fully.

CAUTION **The collimator rotation lever must be fully depressed when mounting/installing the collimator to the tube/collimator interface plate. Failure to do so could cause the collimator to mount improperly and fall from the unit.**

Note:* *Apply grease supplied to collimator mount flange and the tube/collimator interface plate (see picture below) for easy movement.



8. Tighten the 3 collimator mounting screws in equal number of turns until they lock securely and can not be turned anymore. Then back out each screw equally by maximum 1/2 turn, so that collimator can rotate freely. Verify that when the collimator is not in a detent location, the minimum rotate force is 20N.



9. Turn the X-ray tube back into normal position.

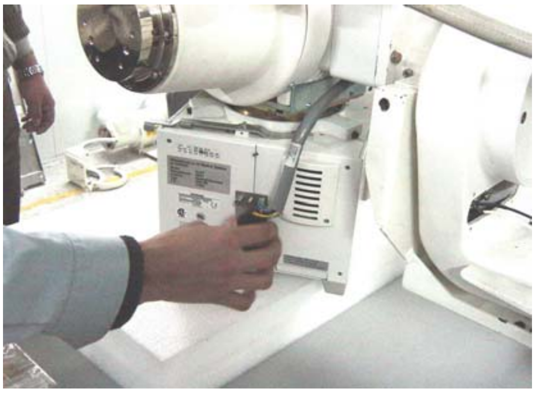
WARNING

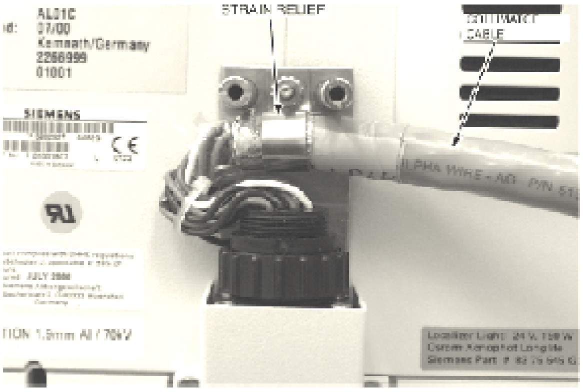
CHECK THAT THE MOUNTING IS CORRECT BEFORE TURNING THE TUBE BACK TO NORMAL POSITION.

BE SURE THAT THREE THRUST BUSHINGS ARE SYMMETRIC TO THE CENTER AND HOLD THE FLANGE FIRMLY.

10. Loosen the X-ray tube. Use level gauge to check that the tube and collimator are in level position, then fasten the tube using trunion handle securely.

11. Connect the Collimator Power & CAN cable (GPCP No., 2391024).



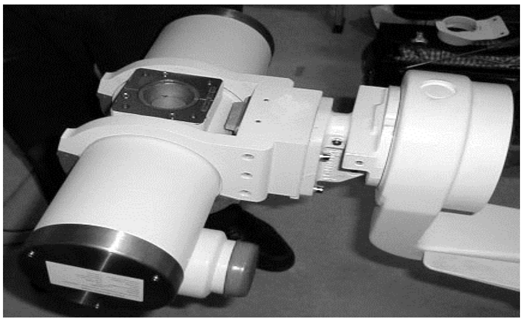


Note: ***For MX100 X-ray tube, if the X-ray field and light field of Collimator are not aligned after mounting, the performing of Job Card IST 032 "MX100 X-ray tube-Collimator Interface Plate Alignment" in Chapter 3 can calibrate and ensure the alignment of X-ray field and light field of Collimator.***

PROTEUS XR/A			**1/3**	**IST 016**
Subassembly: **Mount Eclipse Proteus Collimator to RAD 14,21 X-ray Tube**				
Purpose: Installation Procedure			*Version no.* 1 *Date:* **15/12/06**	
NF No.	*Production date*	*Serial No.*	*Personnel:2*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

***Note:* This Job Card is only for RAD 14,21 X-ray tube. For the mounting of Eclipse Proteus Collimator to MX100 X-ray tube, please refer to Job Card IST 017 in this Chapter.**

1. Rotate the tube 180°.

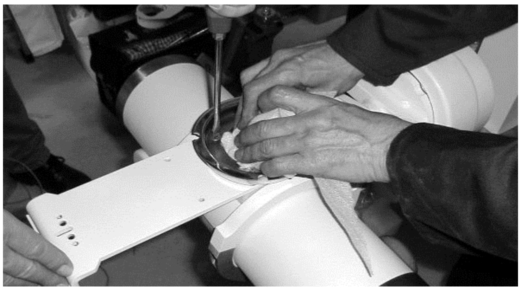


2. Mount the collimator mounting flange and the OTS console bracket with four provided screws.

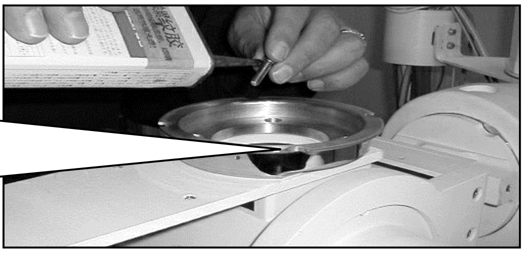
***Note:* If the flange has been mounted in the factory, skip this step.**

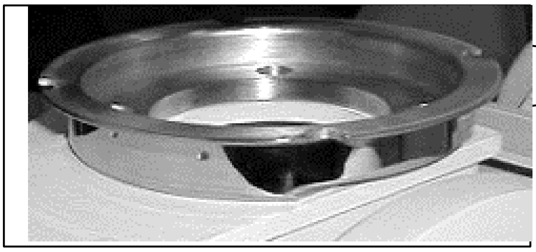
WARNING

USE SOME MATERIAL TO PROTECT TUBE WINDOW WHEN FASTENING SCREWS. PAY ATTENTION TO THE DIRECTION OF FLANGE. THE SLOT SHOULD BE ALIGNED WITH OTS CONSOLE BRACKET.



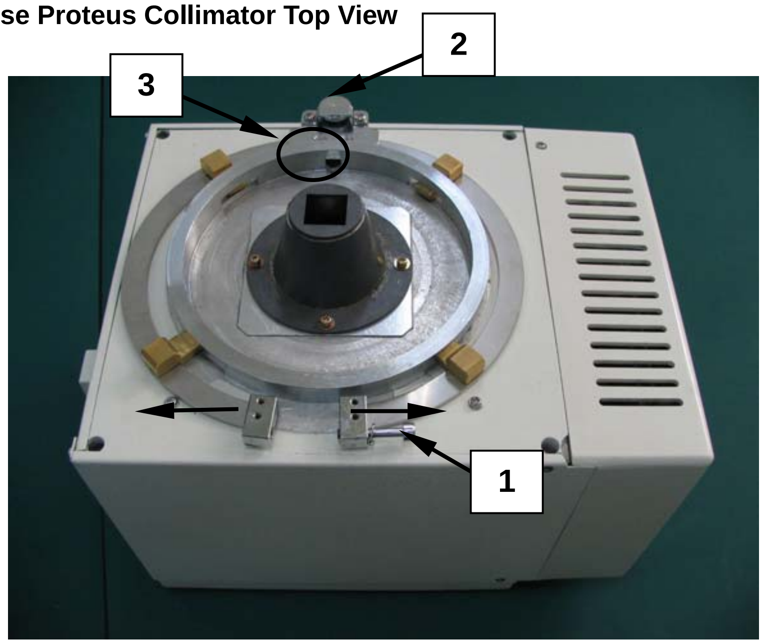
***Note:* Apply locktite 242 to flange mount screws.**
The force fastening screws is between 10~13 N.m





3. Loosen the screw (1), put the two clamps outwards to the max opening position. Put the locking Block (3) inside the holder.

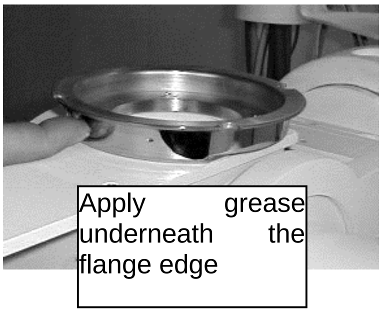
Illustration: Eclipse Proteus Collimator Top View



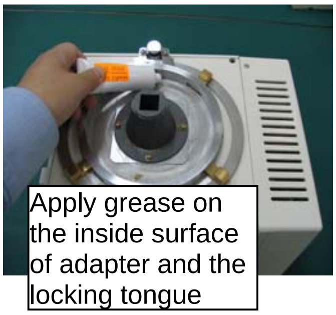
4. Position the collimator on the X-ray tube.

Note:* *Be sure the Locking Block is inside the holder.

Note:* *Apply grease supplied to collimator mount flange, collimator adapter and locking tongue for easy movement.



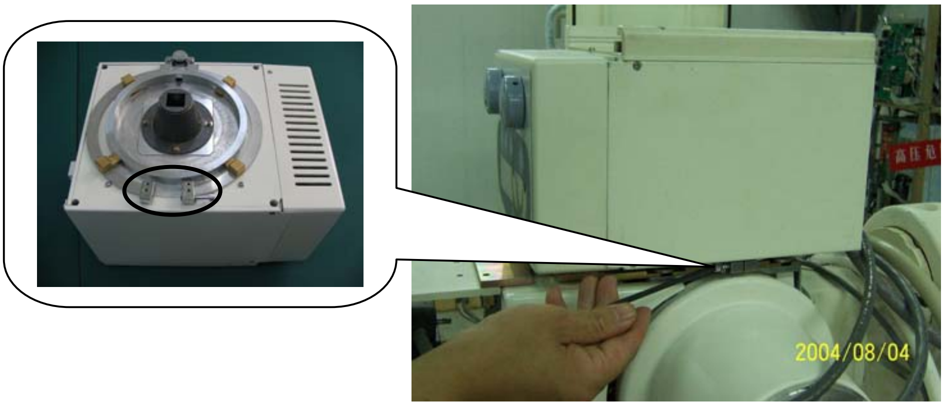
Apply grease underneath the flange edge



Apply grease on the inside surface of adapter and the locking tongue

5. Put the two clamps closed. Make sure that collimator is properly connected with the flange.

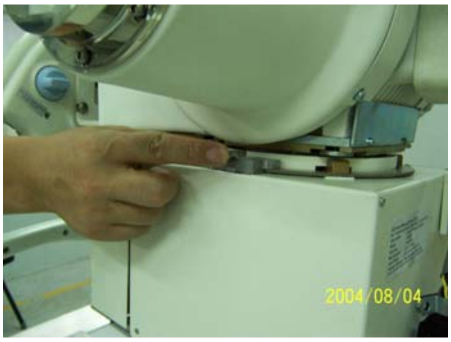
Note:* *Tighten the screw (1) in Illustration Eclipse Proteus Collimator Top View with torque of 5.6 Nm.



PROTEUS XR/A	3/3	IST 016

6. Loosen the locking screw, rotate the collimator to the normal position, and then, tighten the locking screw.

Note: The collimator is in normal position only after a click is heard.


2004/08/04

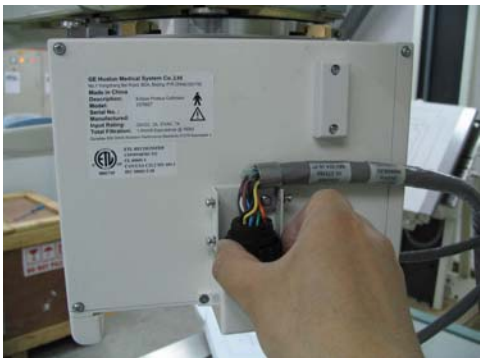
7. Turn the X-ray tube back into normal position.

WARNING **CHECK THAT THE MOUNTING IS CORRECT BEFORE TURNING THE TUBE BACK TO NORMAL POSITION.**

8. Loosen the X-ray tube. Use level gauge to check that the tube and collimator are in level position, and then fasten the tube using trunion handle securely.

Note: ***For RAD 21 X-ray tube, there is no trunion handle.***
Just need to fasten clamp screws.
Apply locktite to mount screws.

9. Mount the OTS Console.
10. Connect the collimator cable (GPCP No., 2391024).



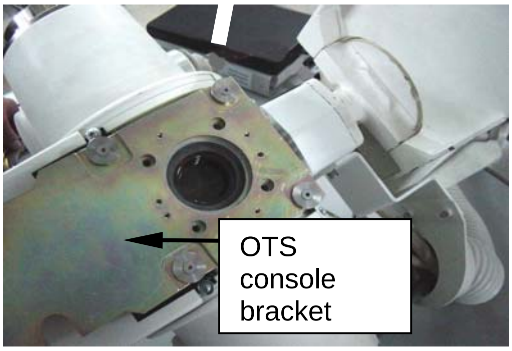
11. Fix the cable on the strain relief screw with M5 nut.
12. Mount the cable cover.

PROTEUS XR/A			**1/3**	**IST 017**
Subassembly: **Mount Eclipse Proteus Collimator to MX100 X-ray Tube**				
Purpose: Installation Procedure			*Version no.* 1 *Date:* **15/12/06**	
NF No.	*Production date*	*Serial No.*	*Personnel: 2*	
	From / / *To / /*	*From* *To*	*Time:* **20min**	

***Note:* This Job Card is only for MX100 X-ray tube. For the mounting of Eclipse Proteus Collimator to RAD 14,21 X-ray tube, please refer to Job Card IST 016 in this Chapter.**

1. Rotate the tube 180°.

Note: Step 4 to 5 should be performed only when the OTS console bracket and collimator interface plate are not assembled with the MX100 X-ray tube when arriving at the install site. Otherwise, if the OTS console bracket and collimator interface plate are already assembled at the factory, skip to step 6 directly.



2. Mount the OTS console bracket.

Note: Apply locktite to OTS console bracket mount screws when mounting.

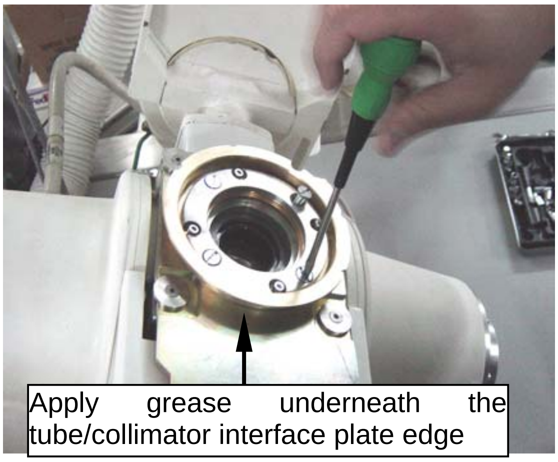
3. Mount the tube/collimator interface plate.

WARNING

USE SOME MATERIAL TO PROTECT TUBE WINDOW WHEN FASTENING SCREWS.

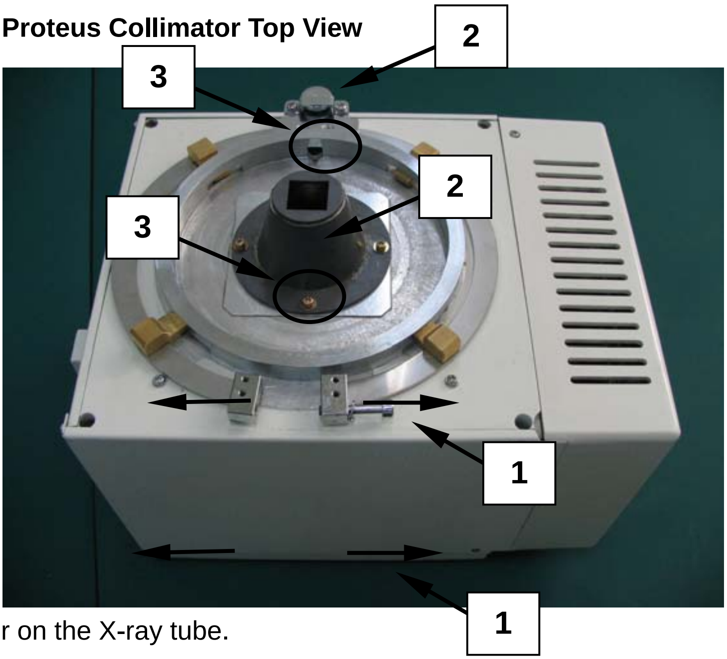
PAY ATTENTION TO THE DIRECTION OF PLATE. THE SLOT SHOULD BE ALIGNED WITH OTS CONSOLE BRACKET.

Note: Apply LOTITE 242 to tube/collimator interface plate mount screws when mounting.


Apply grease underneath the tube/collimator interface plate edge

4. Loosen the screw (1), put the two clamps outwards to the max opening position. Put the locking Block (3) inside the holder.

Illustration: Eclipse Proteus Collimator Top View

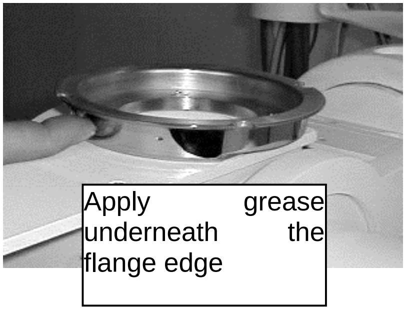


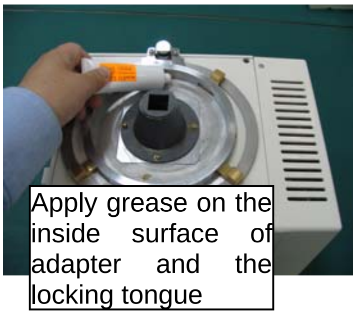
5. Position the collimator on the X-ray tube.

Note: ***Be sure the Locking Block is inside the holder.***

Note: ***If the replaced collimator is Siemens unit, remove the lead cup on tube side before new collimator installation.***

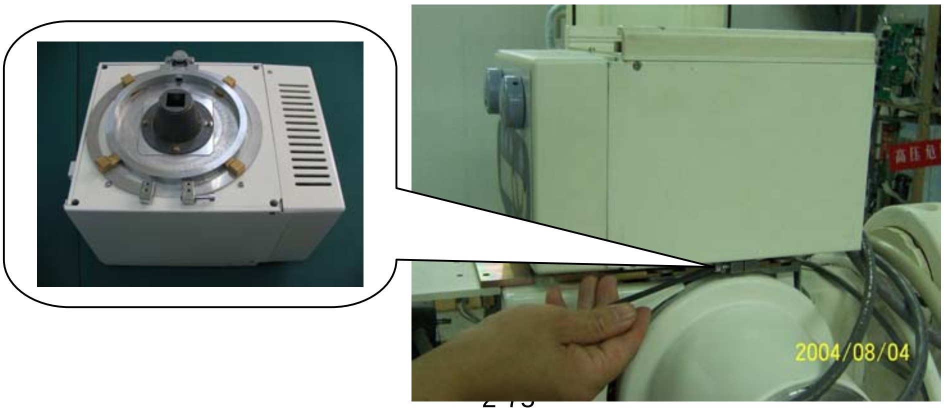
Note: ***Apply grease supplied to collimator mount flange, the tube/collimator interface plate and locking tongue (see picture below) for easy movement.***


Apply grease underneath the flange edge


Apply grease on the inside surface of adapter and the locking tongue

6. Put the two clamps closed. Make sure that Eclipse Proteus Collimator is properly connected with the flange.

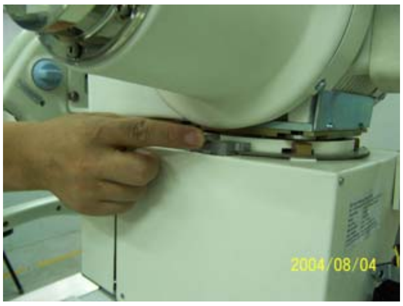
Note: ***Tighten the screw (1) in Illustration Eclipse Proteus Collimator Top View with torque of 5.6 Nm.***



PROTEUS XR/A	**3/3**	**IST 017**

7. Loosen the locking screw, rotate the collimator to the normal position, and then, tighten the locking screw.

Note:* *The collimator is in normal position only after a click is heard.

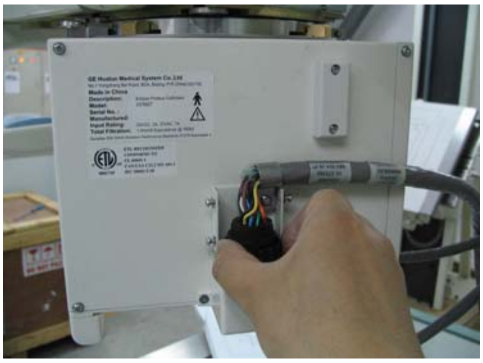


8. Turn the X-ray tube back into normal position.

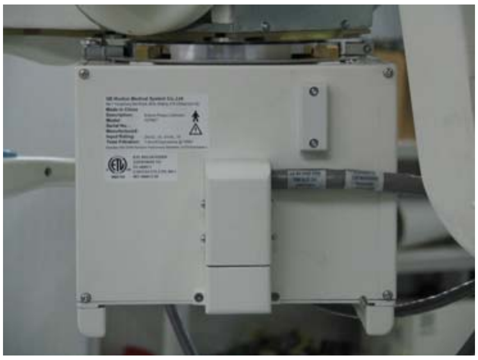
WARNING **CHECK THAT THE MOUNTING IS CORRECT BEFORE TURNING THE TUBE BACK TO NORMAL POSITION.**

9. Loosen the X-ray tube. Use level gauge to check that the tube and Eclipse Proteus Collimator are in level position, then fasten the tube using trunion handle securely.

10. Connect the Collimator Power & CAN cable (GPCP No., 2391024).



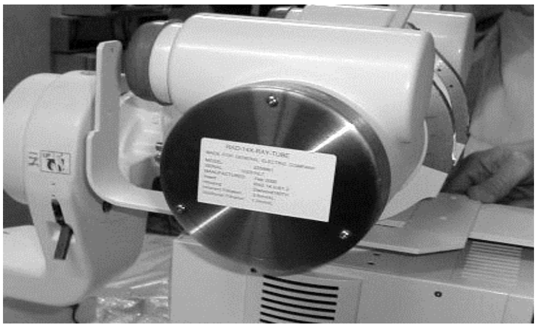
11. Fix the cable on the strain relief screw with M5 nut.
12. Mount the cable cover.



Note:* *For MX100 X-ray tube, if the X-ray field and light field of Eclipse Proteus Collimator are not aligned after mounting, the performing of Job Card IST 032 "MX100 X-ray tube-Collimator Interface Plate Alignment" in Chapter 3 can calibrate and ensure the alignment of X-ray field and light field of Eclipse Proteus Collimator.

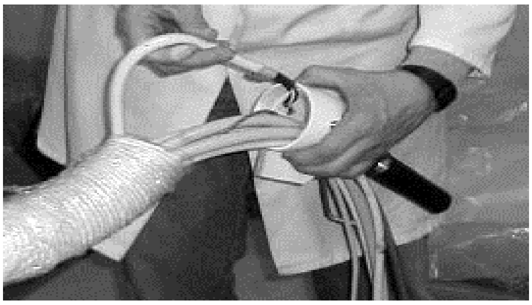
PROTEUS XR/A SYSTEM			**1/6**	**IST 018**
Subassembly: **Assemble Tube Cover to RAD 14,21 X-ray Tube**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **1 hours**	

Note: ***This Job Card is only for assembling the tube cover to RAD 14,21 X-ray tube. For the assembling of the tube cover to MX100 X-ray tube, please refer to Job Card IST 019 in this Chapter.***

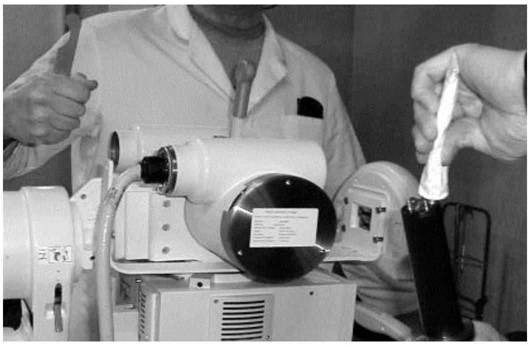


1. Mount cable support bracket with two screws.

Note: ***If Tomo-link function is selected, please use the bracket marked with "For Tomo".***



2. Insert all cables into cable support.

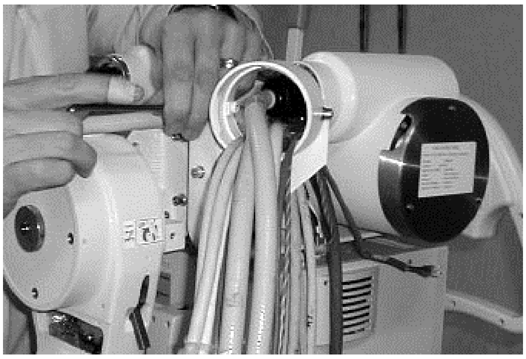


3. Insert HV cables into HV cable (2269002-3 or 2269002) socket.

WARNING

APPLY SILICON GREASE ON BOTH SIDES OF PLUGS BEFORE CONNECTING THE HIGH VOLTAGE PLUG!!

USE HV CABLE WRENCH TO TIGHTEN HV CABLE SECURELY.



4. Connect stator (2258386 or 2258386-2) and Thermal SW cables (2258384 or 2258384-2) to X-ray tube. Refer to Job Card IST 020.

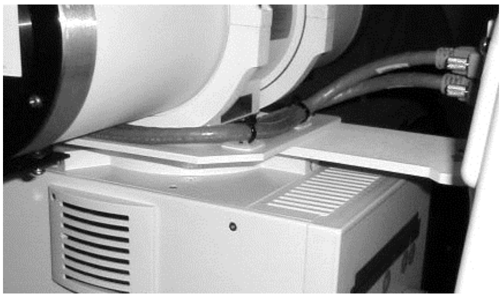
5. Mount cable support onto bracket with two screws.

CAUTION

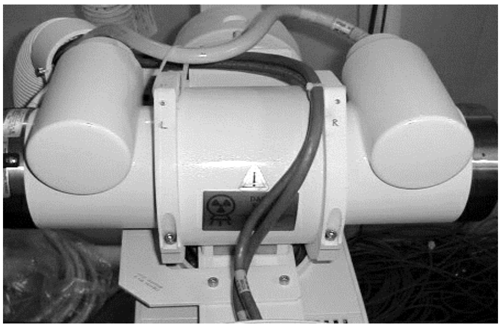
Hazardous voltage on the Internal Shield of Anode Rotation Cable. It can cause severe injury, death.Turn off power before any manipulation of the cable.

PROTEUS XR/A SYSTEM	2/6	IST 018

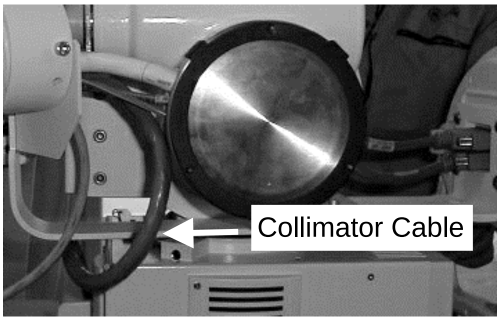
6. Connect OTS Console CAN (2259867), OTS Console Lock PWR (2258381) and Collimator Power & CAN (2391024) cables. Refer to Jobcard IST 020.Then use ty-rap to fasten the two cables.



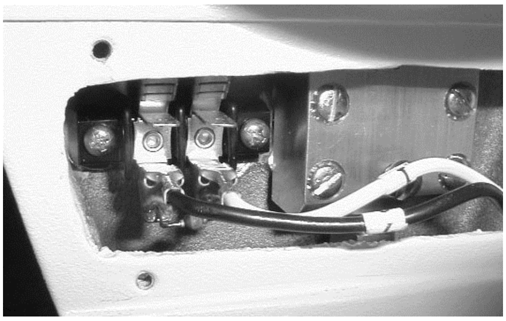
Note: ***For RAD 21 X-ray tube, these two cables go through the top of X-ray tube.***



Note: ***Route the Collimator Cable according to the picture shown here.***

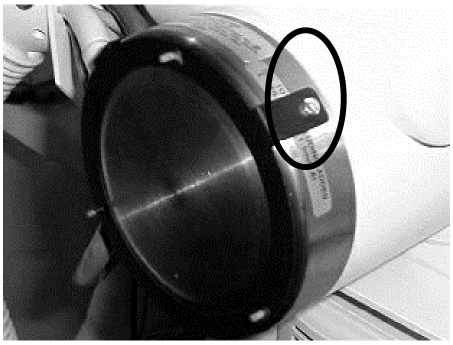


7. Connect Angulation lock cable. See Illustration.



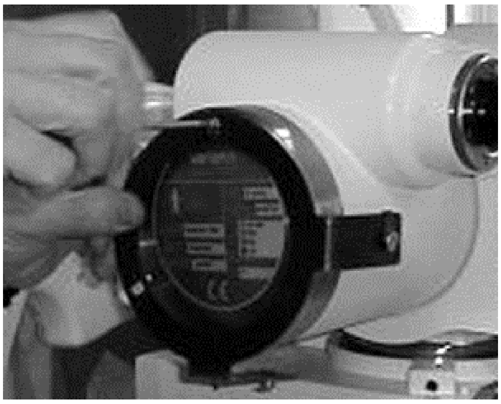
8. Mount two tube cover adapters to X-ray tube.

Note: ***This step is for RAD 21 X-ray tube. For RAD 14 X-ray tube, skip to step 9.***

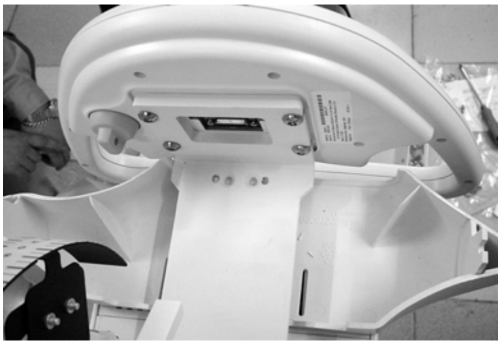


9. Mount two tube cover brackets onto X-ray tube.

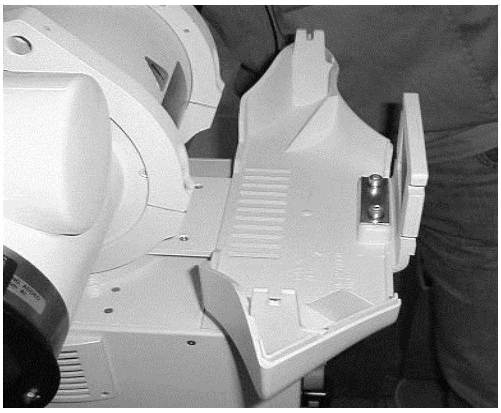
Note: ***For RAD 21 X-ray tube, mount the tube cover brackets onto the adapter.***



10. Mount bottom cover **under** the OTS Console bracket.

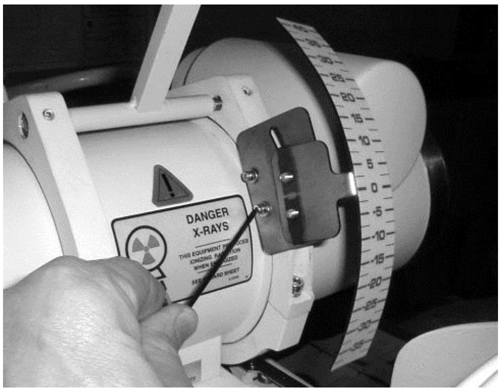


Note: ***For RAD 21 X-ray tube, mount bottom cover onto the OTS Console bracket.***



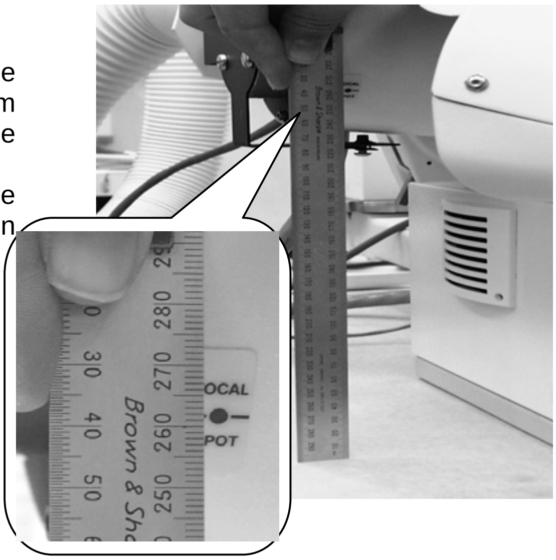
11. Mount Tube Angulation meter.

Note: ***For RAD 21 X-ray tube, skip this step.***

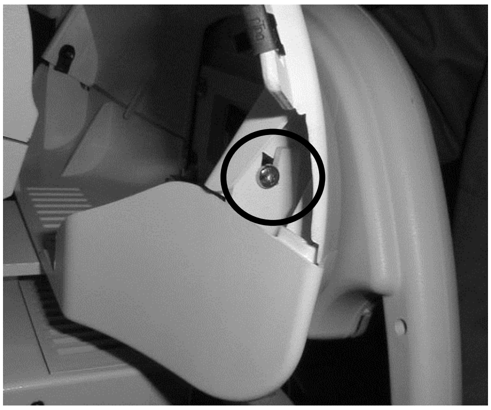


12. Locate the focal spot label on the tube.

13. Lower the tube and collimator to the table top until the bottom of the collimator rests on the table top. The bottom of the collimator should remain flush with the table when the locks are engaged.
14. Make a reference measurement from the table top to the center of the focal spot label and record this dimension (See Figure 1 and Figure 2). It is recommended to use a steel scale (as shown) with 0.5mm divisions.



15. Mount the front cover.

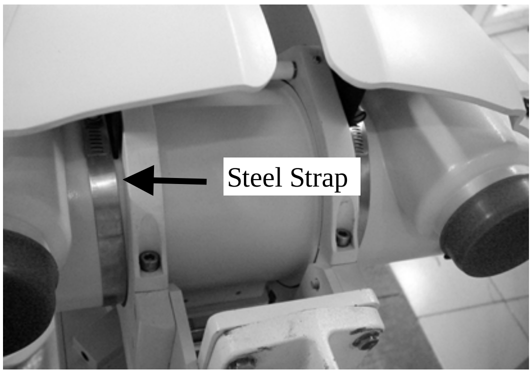


Note: ***For RAD 21 X-ray tube, there has no angulation meter window.***

PROTEUS XR/A SYSTEM	5/6	IST 018

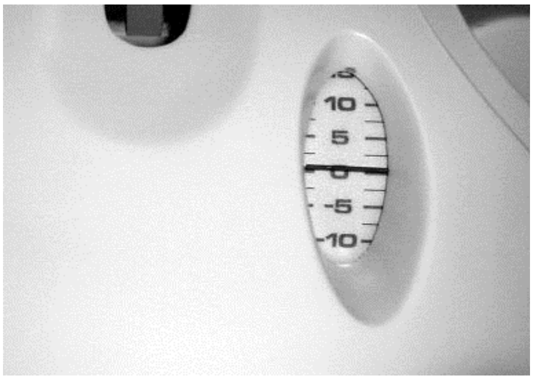
16. Mount two steel straps on both sides of front cover.

Note: For RAD 21 X-ray tube, skip this step.



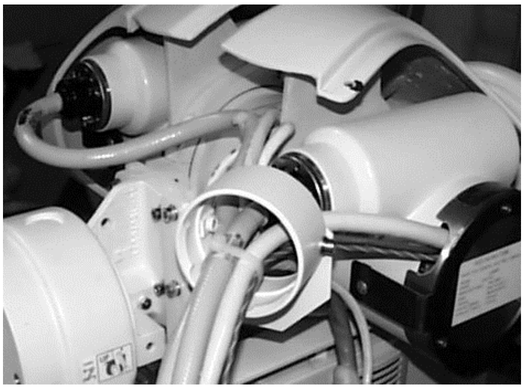
17. Adjust the Angulation meter to 0. Then fasten screws.

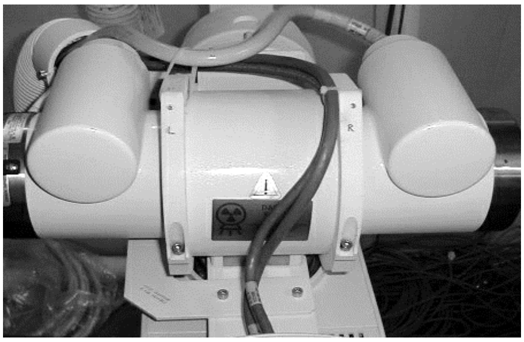
Note: For RAD 21 X-ray tube, skip this step.



18. Use ty-rap to fasten all cables.

Note: For RAD 21 X-ray tube.

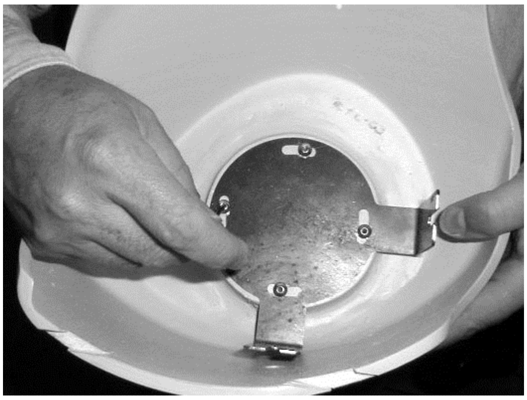




19. Mount both side covers and fasten screws.

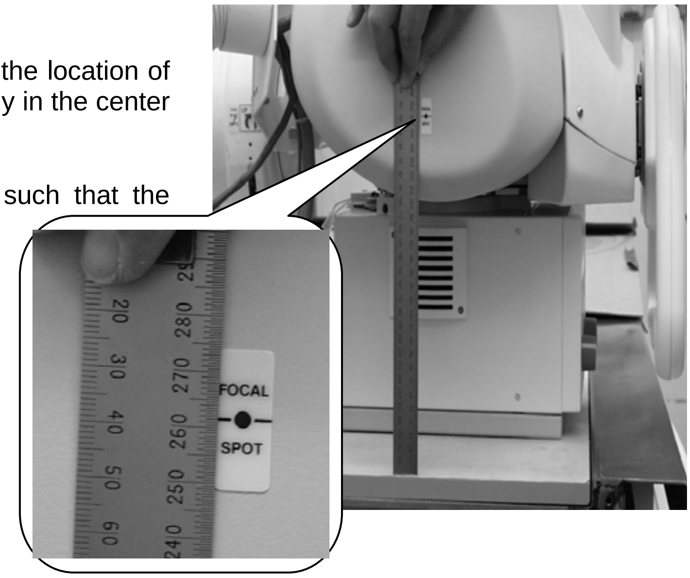
If screw holes don’t match, loosen the four screws in side cover a little.

Re-adjust the bracket position. Then mount the side cover.



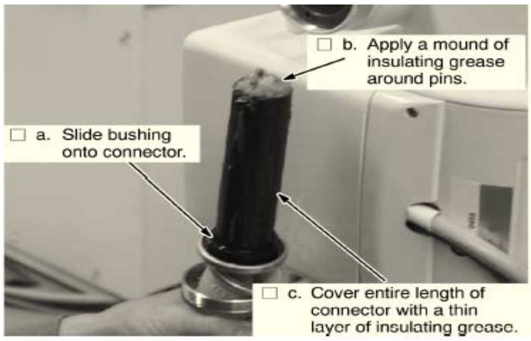
20. Using same gage as in step 3 to determine the location of the focal spot label on the tube cover, roughly in the center of the cover in the system Lateral direction.

21. Apply the focal spot label (46-239720P2) such that the center of the focal spot label coincides with the dimension recorded in step 13.



PROTEUS XR/A SYSTEM			**1/7**	**IST 019**
Subassembly: **Assemble Tube Cover to MX100 X-ray Tube**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **03/01/03**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **1 hours**	

***Note:* This Job Card is only for assembling the tube cover to MX100 X-ray tube. For the assembling of the tube cover to RAD 14,21 X-ray tube, please refer to Job Card IST 018 in this Chapter.**

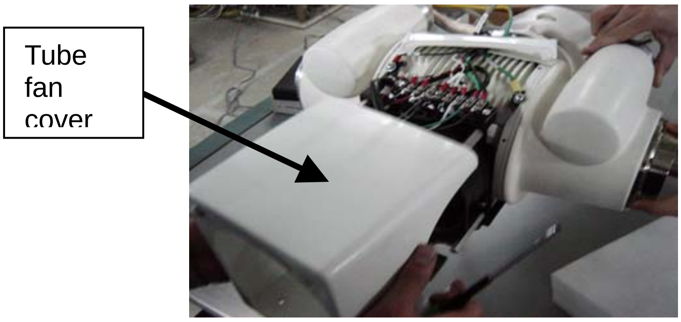

☐ b. Apply a mound of insulating grease around pins.
☐ a. Slide bushing onto connector.
☐ c. Cover entire length of connector with a thin layer of insulating grease.

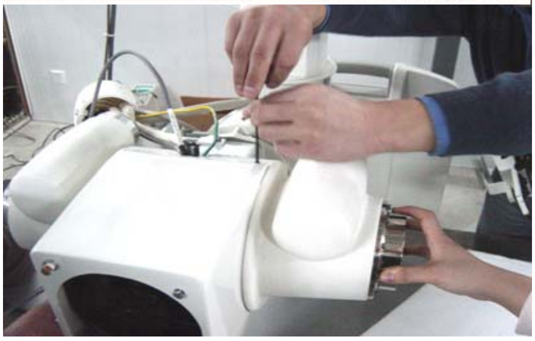
1. Insert HV cables into HV cable (2269002-3 or 2269002) socket.

WARNING

Apply silicon grease on both sides of plugs before connecting the High Voltage plug!!
Use HV cable wrench to tighten HV cable securely.

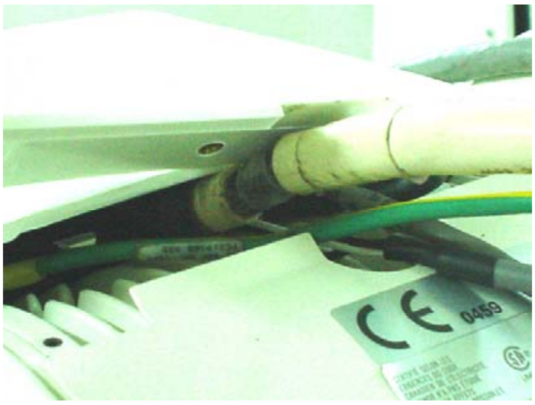
2. Connect Rotation cable (2380062 or 2380062-2), Thermal SW cable (2403008 or 2403008-2) , and other tube cables to X-ray tube. Refer to Job Card IST 020.


Tube fan cover



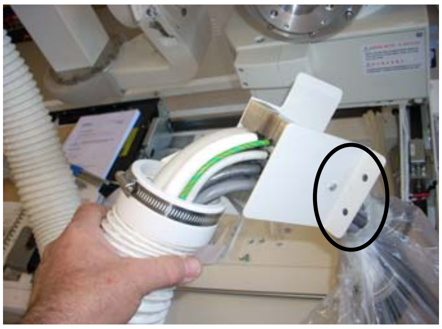
5. Secure cables to cable entrance cover with clamp.

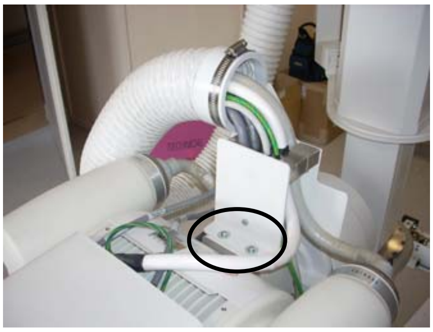
Note: Because of the size of cables is larger than the clamp, you can use the clamp to secure the single largest cable only. And make other cables accompany with the clamped cable when exiting from the hole on the cable entrance cover.



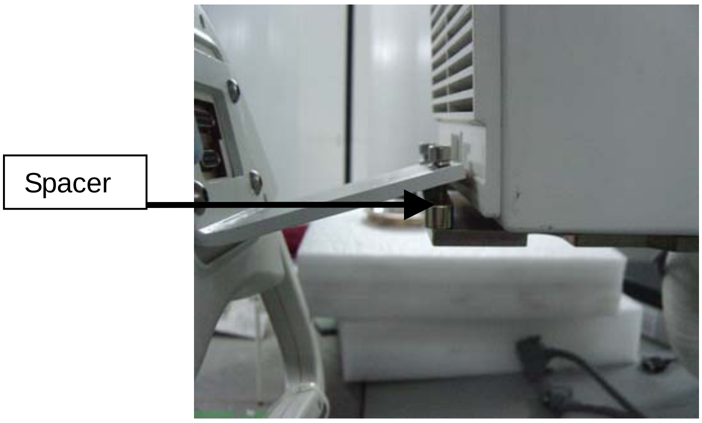
6. Mount cable support onto bracket with two screws.

CAUTION **Hazardous voltage on the Internal Shield of Anode Rotation Cable. It can cause severe injury, death.Turn off power before any manipulation of the cable.**





7. Mount the OTS console.



8. Connect OTS Console CAN (2391017), OTS Console Lock PWR (2391020) to the back of OTS Console.

9. Connect Angulation lock cable. See Illustration.
11. Locate the focal spot label on the X-ray tube.
12. Lower the tube and collimator until the bottom of the collimator rests on the table top and engage the vertical lock.
13. Using a steel scale, measure and record the distance from the table top to the focal spot.

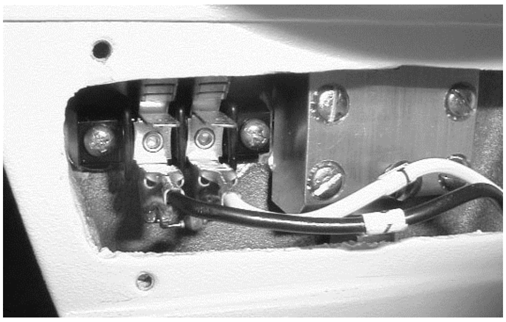


TABLE TOP TO FOCAL SPOT MEASUREMENT

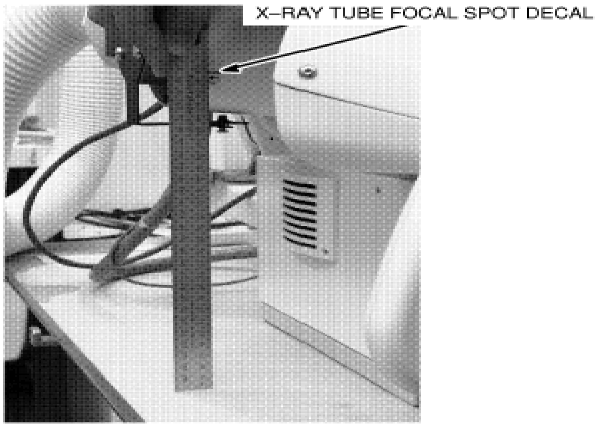
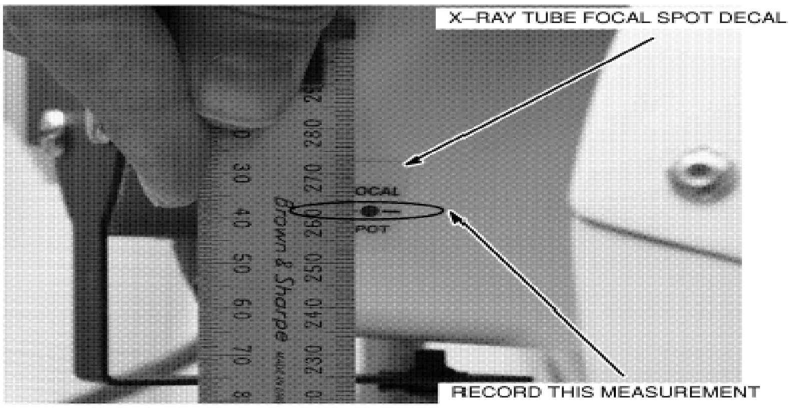

X–RAY TUBE FOCAL SPOT DECAL

TABLE TOP TO FOCAL SPOT MEASUREMENT

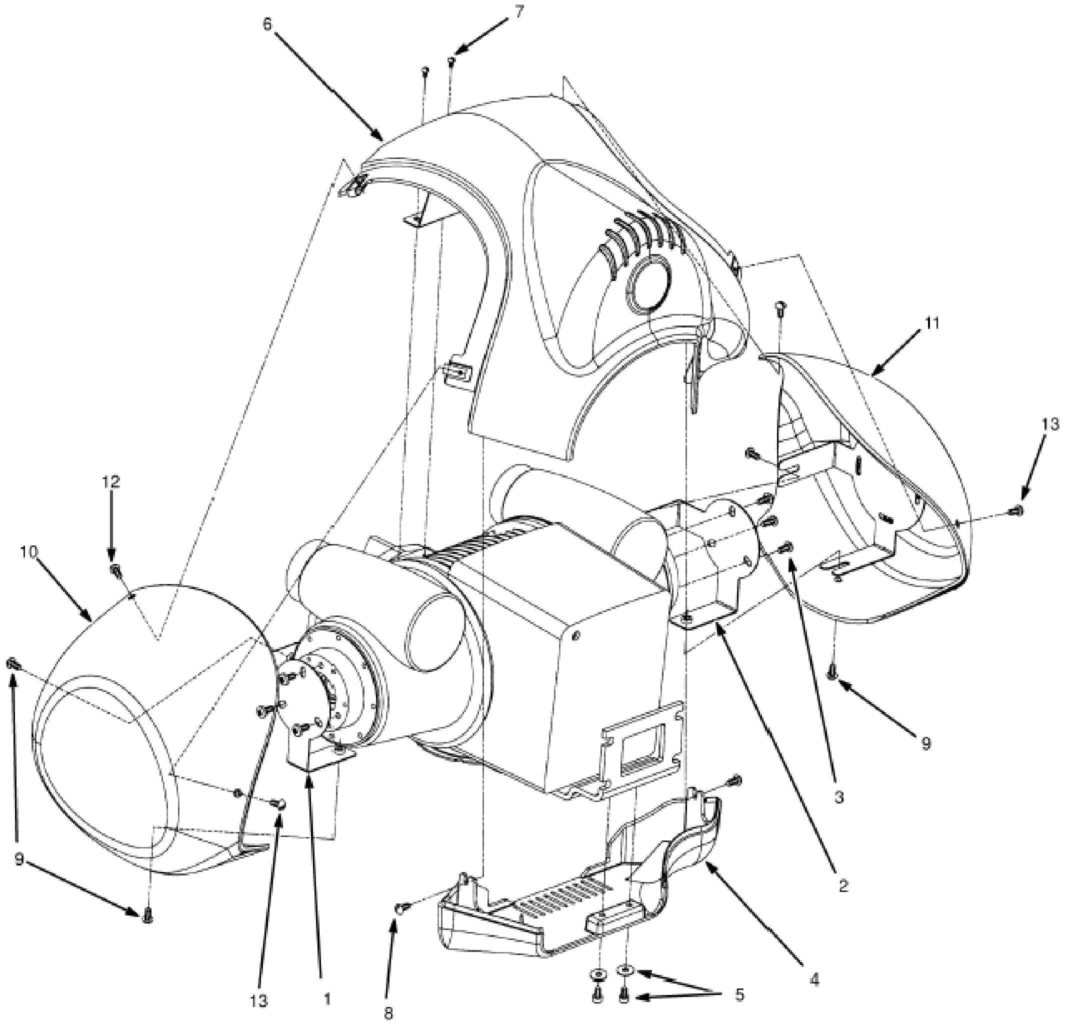

X–RAY TUBE FOCAL SPOT DECAL
OCAL
POT
Brown & Sharpe
RECORD THIS MEASUREMENT

Note: ***Refer to Illustration "LOWER TUBE COVER INSTALLATION" on the next page while performing the following steps.***

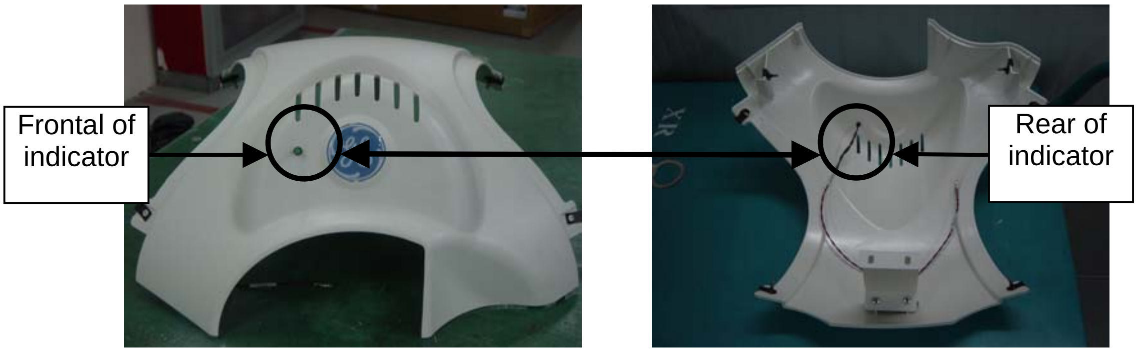
14. Install the end cover mounting brackets (1&2) on both ends of the tube using three (3) screws for each bracket.
15. Install the bottom cover (4) using 2 screws and washers (5).

PROTEUS XR/A SYSTEM	4/7	IST 019

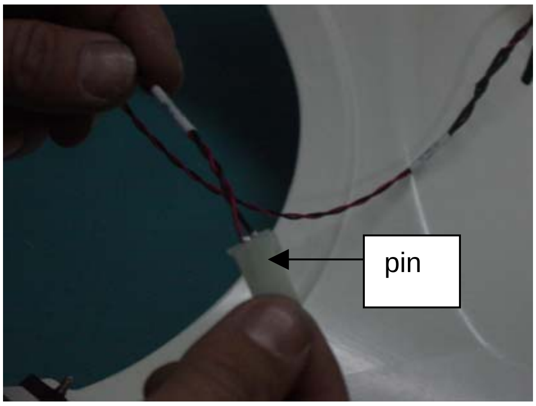
LOWER TUBE COVER INSTALLATION


6
7
11
13
12
10
9
3
2
4
5
8
1
13
9

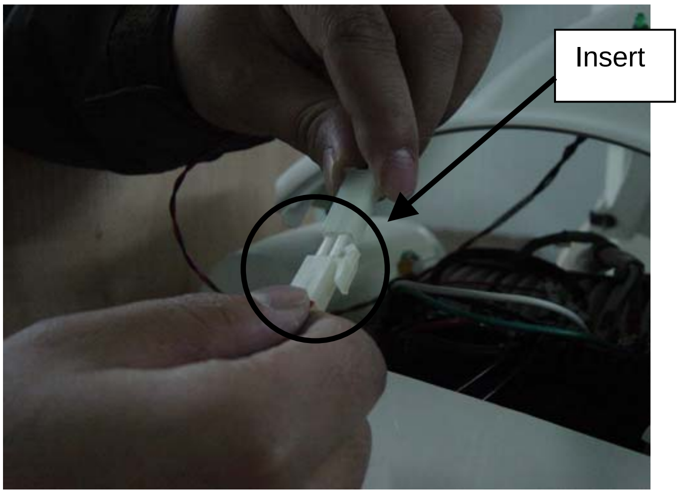
16. Install the tube indicator.
    1) Connect the tube indicator with tube indicator cable (indicator end: 2318489), and put the pin on.


Frontal of indicator
Rear of indicator

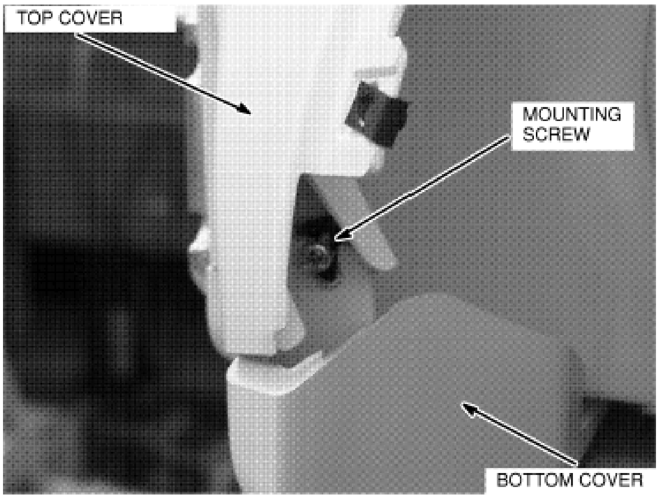
PROTEUS XR/A SYSTEM	5/7	IST 019



2) Insert the two pins (indicator end and tube end).



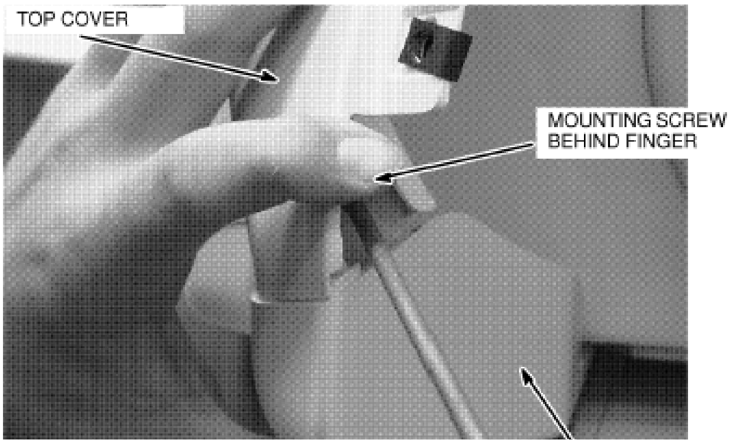
17. Install one screw on each side of top cover. Engage each screw only a few turns to allow the tab on bottom cover to slide under the screw head.


TOP COVER
MOUNTING SCREW
BOTTOM COVER

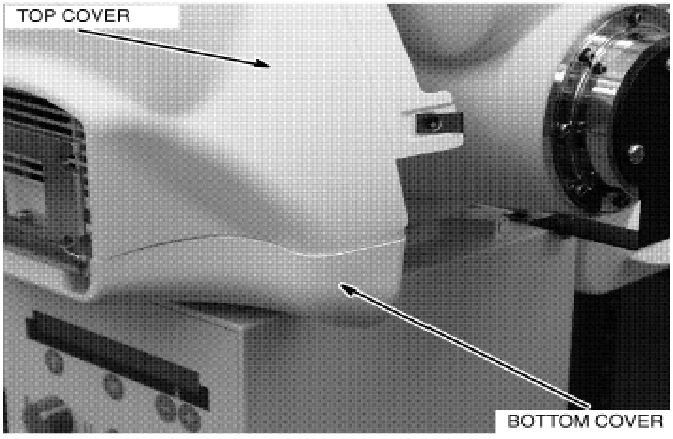
18. Install the top cover (6) and secure using 2 screws (7) on the upper back.

19. Squeeze the top and bottom cover together and tighten the two screws (8) that were started in step 16. When complete, the cover gap should look like Illustration below.

TOP COVER ADJUSTMENT



FINAL COVER APPEARANCE



20. Install 2 end cover mounting screws (9) in each end cover mounting bracket. One from the bottom and one from the back. Engage each screw only a few turns leaving room for the end cover internal bracket to slide between the screw head and the end cover mounting bracket (1&2).

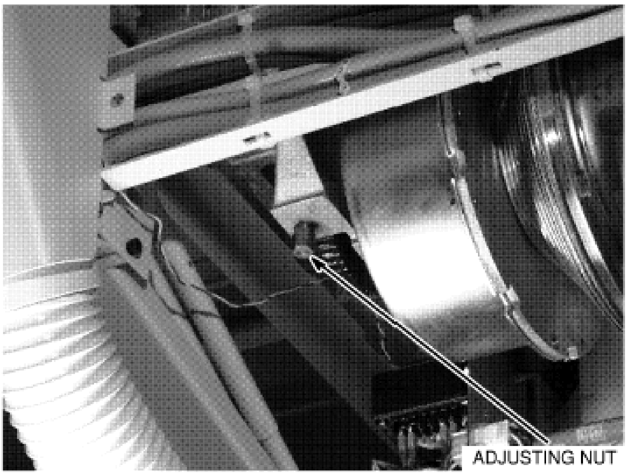
21. Position the end covers (10&11) by sliding the slots on the internal bracket under the screw heads on the end cover mounting brackets.

22. Tighten the four screws (9) that were only started in step 17. The bottom screw is accessed through a hole in the end cover.

23. Secure the end covers (10&11) by installing two screws (12&13) through each end cap and into the top cover.

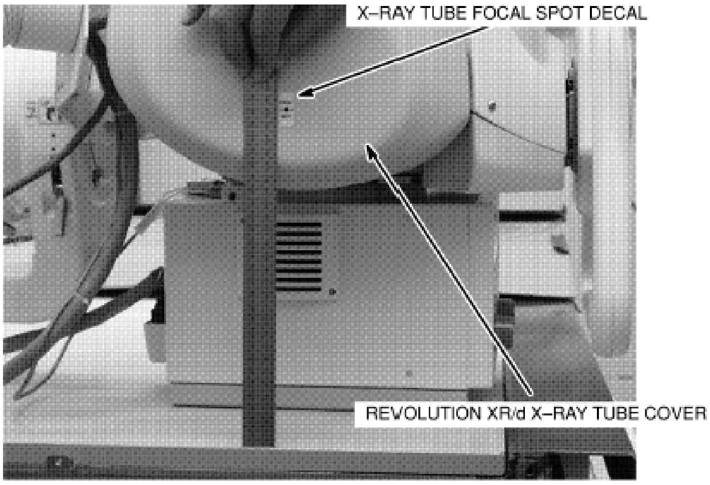
24. If necessary, adjust the counterpoise spring to eliminate any vertical drift of the OTS.

COUNTERPOISE SPRING ADJUSTING NUT

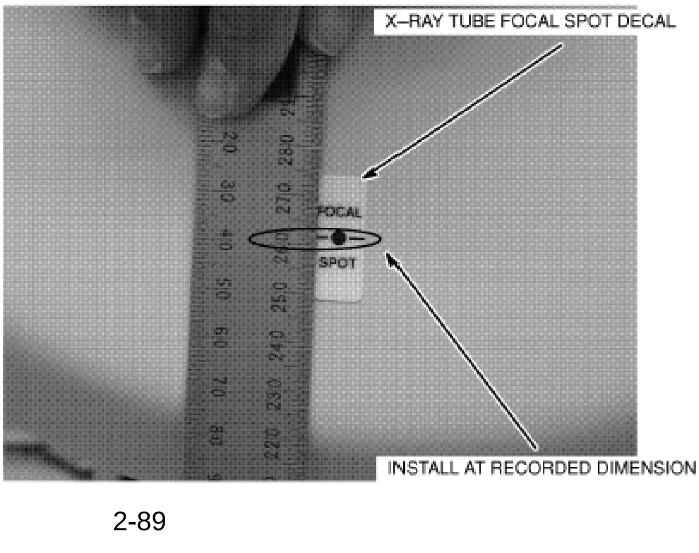

ADJUSTING NUT

25. Using the same metal scale and the dimension recorded earlier, determine the location of the focal spot and apply the new focal spot decal in the center of the anode X-ray tube cover.

FOCAL SPOT DECAL INSTALLATION


X–RAY TUBE FOCAL SPOT DECAL
REVOLUTION XR/d X–RAY TUBE COVER

FOCAL SPOT DECAL INSTALLATION

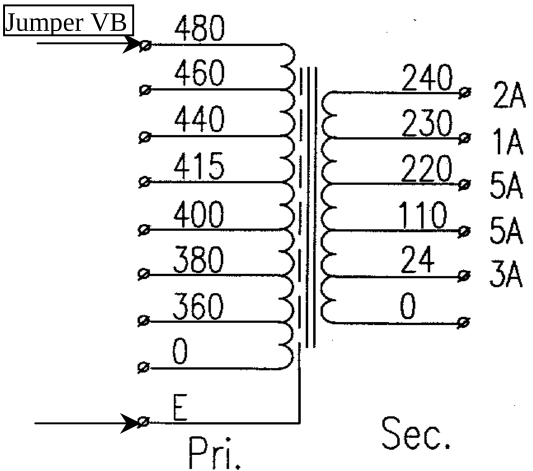

X–RAY TUBE FOCAL SPOT DECAL
FOCAL
SPOT
INSTALL AT RECORDED DIMENSION

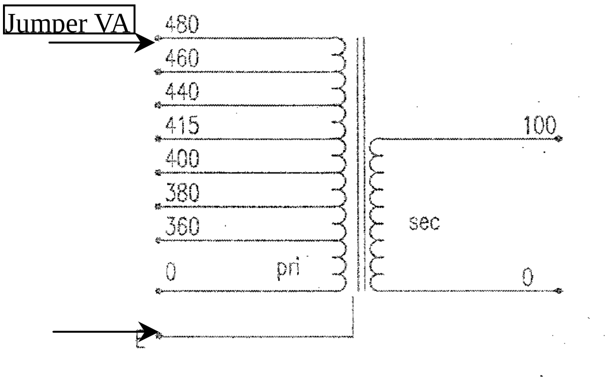
PROTEUS XR/A SYSTEM			**1/12**	**IST 020**
Subassembly: **Electrical Connections**				
Purpose: Installation Procedure			*Version no.* 1 *Date:* **12/12/05**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **1and half hours**	

WARNING

THE PDU CONTAINS TWO POWER TRANSFORMERS. THE FACTORY DEFAULT INPUT IS SET TO 380V. THE FIELD ENGINEER MUST ADJUST INPUT VOLTAGE ACCORDING TO LOCAL POWER.

The transformer schematics are shown as follows.





Default Factory Setting

1. Adjust the jumper VB and jumper VA according to local power voltage.
2. Connect all cables according to following table.
3. Apply silicon grease on both sides of plugs before connecting the High Voltage plug!!
4. Pay attention to the polarity of the X-ray tube. Incorrect connection will destroy the X-ray tube.
5. Connect system power cable.

WARNING

ALL COMPONENTS MUST BE SECURELY GROUNDED.

MAKE SURE THAT PLUGS ARE NOT LOOSE!

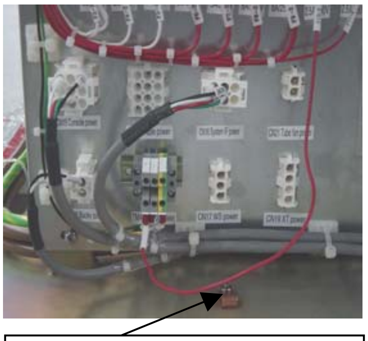
CHECK WHETHER ALL CABLES ARE CONNECTED CORRECTLY.

THE EXCESS SHOULD BE PUT IN PROPER PLACE. IF NEEDED, COIL THE EXCESS CABLE. FOR SAFETY AND MAINTENANCE, ALL CABLES SHOULD BE WRAPPED AND FIXED.

6. After checking components grounding and cable connections, power on the system.

PROTEUS XR/A				2/12	IST 020	
Item Number	Cable Name	Cable Parts Number	Supplier Number	Plug or Connector		Finish
				One End	The Other End	
1	OTS power cable (2m)	2258387		OTS J100	PDU CN19	
1-1	OTS power cable (3m)	2258387-2		OTS J100	PDU CN19	
2	OTS Grounding Cable	46-315243G3		OTS	PDU GND	
3	OTS SID & tomo I/O Cable (2m)	2258388		OTS J101	Connector 3 (on the top of OTS) I/F Board J111	
3-1	OTS SID & tomo I/O Cable (3m)	2258388-2		OTS J101	Connector 3 (on the top of OTS) I/F Board J111	
4 *2	OTS CAN Cable (2m)	2258389		OTS CN3	I/F Board J116	
4-1 *2	OTS CAN Cable (3m)	2258389-2		OTS CN3	I/F Board J116	
5	Rotor control Cable (2m)	2258386		Jedi	Tube	
5-1	Rotor control Cable (3m)	2258386-2		Jedi	Tube	
5-2	Rotor control Cable (2m) for MX100	2380062		Jedi	Tube	
5-3	Rotor control Cable (3m) for MX100	2380062-2		Jedi	Tube	
6	Thermal SW Cable (2m)	2258384		Jedi	Tube	
6-1	Thermal SW Cable (3m)	2258384-2		Jedi	Tube	
6-2	Thermal SW Cable (2m) for MX100	2403008		Jedi	Tube	
6-3	Thermal SW Cable (3m) for MX100	2403008-2		Jedi	Tube	
7	HV Cable (20m)	2269002-3		Tube	Jedi	
7-1	HV Cable (24m)	2269002		Tube	Jedi	
8 *2	Collimator power & CAN Cable	2391024		OTS CN1	Proteus XR/a Collimator/Eclipse Proteus Collimator	
9 *2	OTS Console Power & CAN Cable	2259867		OTS CN4	OTS console	
9-1	OTS Console Power & CAN Cable for MX100 tube	2391017		OTS CN4	OTS console	
10 *1	OTS Console Locks Power Cable	2258381		OTS power board **Lower** connector	OTS console	
10-1	OTS Console Locks Power Cable for MX100	2391020		OTS power board **Lower** connector	OTS console	
11	OTS Long SID Switch Cable (2m)	46-329249G3				
11-1	OTS Long SID Switch Cable (3m)	46-329249G4				
12	Ground Lead 15.5 Foot	46-216211G16				
13	OTS I/F PCB To PWR Supply Cable	2268131		OTS power board **Higher** connector	OTS J1	
14	OTS Angulation Lock Cable	46-329256G4				
15	Table height sensing Cable	2259298-56	221-2726	I/F Board J110	Table	
16	AEC(1)			Jedi AEC1	Ion chamber	
17	Table cassette size sensing Cable	2259298-58	221-2727	I/F Board J112	Cassette tray	
18	Table bucky control Cable	2259298-63	M720092-1	Jedi Table bucky	Bucky	
19	Table power Cable	2259298-57	221-2725	PDU CN20	Table	
20	Table grounding Cable	2259298-66	221-2738	PDU GND	Table	
21	AEC(2)			Jedi AEC2	Ion chamber	
22	Wall Stand (GPCP No. 600-0301) cassette size sensing Cable	2259298-58	221-2727	I/F Board J113	Bucky	
23	Wall Stand (GPCP No. 600-0301) bucky control Cable	2259298-63	M720092-2	Jedi Wall bucky	Bucky	

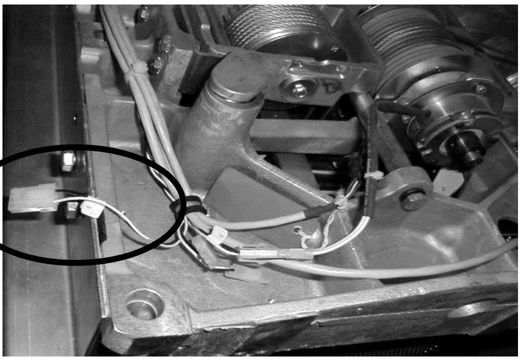
PROTEUS XR/A				3/12	IST 020	
24	Wall Stand (GPCP No. 600-0301) power Cable	2259298-65	600-3025	PDU CN17	Wall Stand	
25	Wall Stand (GPCP No. 600-0301) grounding Cable	2259298-73	221-2738	PDU GND	Wall Stand	
26	SG100 Wall Stand (GPCP No. 2225849) Auto Tray Cable	2145644-2		System I/F Board connector J124	SG100 Wall Stand	
27	SG100 Wall Stand (GPCP No. 2225849) Bucky Cable	2145641-2		Jedi Wall Bucky (J6) connector	SG100 Wall Stand	
28	SG100 Wall Stand (GPCP No. 2225849) Ground Cable	2140362-2		PDU GND	SG100 Wall Stand	
29	SG100 Wall Stand (GPCP No. 2225849) Ion Chamber Cable	2145642-2		Jedi AEC2	SG100 Wall Stand	
30	SG100 (GPCP No. 2225849) Power Supply Cable ***Note: On PDU end of the SG100 Power Supply cable, connect the wire marked “10” to the connector marked “1” of TM4 SG100 Power, connect the wire “11” to connector “2”, connect the yellow-green wire to connector in yellow-green color.***	2151729-2		PDU connector TM4 SG100 Power	SG100 Wall Stand	
31	SG120 Wall Stand (GPCP No. 2402562) Auto Tray Cable	2145644-2		System I/F Board connector J124	SG120 Wall Stand	
32	SG120 Wall Stand (GPCP No. 2402562) Bucky Cable	2145641-2		Jedi Wall Bucky (J6) connector	SG120 Wall Stand	
33	SG120 Wall Stand (GPCP No. 2402562) Ground Cable	2140362-2		PDU GND	SG120 Wall Stand	
34	SG120 Wall Stand (GPCP No. 2402562) Ion Chamber Cable	2145642-2		Jedi AEC2	SG120 Wall Stand	
35	SG120 (GPCP No. 2402562) Power Supply Cable ***Note: On PDU end of the SG120 Power Supply cable, connect the wire marked “10” to the connector marked “1” of TM4 SG100 Power, connect the wire “11” to connector “2”, connect the yellow-green wire to connector in yellow-green color.***	2410108-2		PDU connector TM4 SG120 Power	SG120 Wall Stand	

PROTEUS XR/A				4/12	IST 020	
36	Tube fan power cable (from tube fan to cabinet) for RAD21 tube ***Note:* Pay attention to ensure the grounding of the Tube fan power cable with the P-clamp on cabinet. Use the same one P-clamp to ground the Wall Stand power cable (Item Number 24 in this table) together with the Tube fan power cable if the Wall Stand (GPCP No. 600-0301), not SG100 Wall Stand, is selected.**  P-clamp for Tube fan power cable grounding.	2365706		PDU connector CN21 Tube fan power	Tube terminal strip	
37-1	Tube fan power cable for MX100 tube	2403009		PDU connector CN21 Tube fan power	Tube terminal strip	
37-2	Tube fan power cable for MX100 tube	2403009-2		PDU connector CN21 Tube fan power	Tube terminal strip	
38	System Console Signal Cable	2259298-60	2259977	I/F Board J119	Console	
39	PDU power Cable			BK(LU, LV, LW)	3 phase power	
40	PDU grounding Cable			PDU GND	Power GND	

PROTEUS XR/A	**5/12**	**IST 020**

WARNING **PDU HAS 380-480V POWER EVEN WHEN THE CONSOLE TURNED OFF BUT CIRCUIT BREAKER ON.**

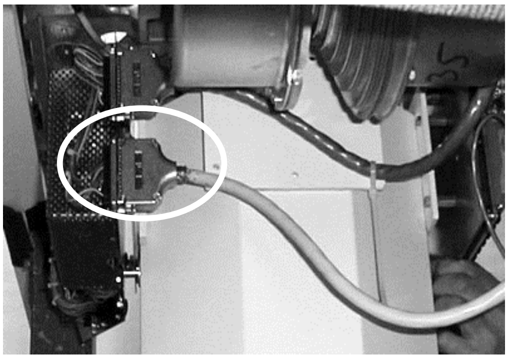
Note: ***To install OTS SID cable, unplug the old cable from connector 3 on the top of OTS, then plug in the new SID cable come from OTS J101.***



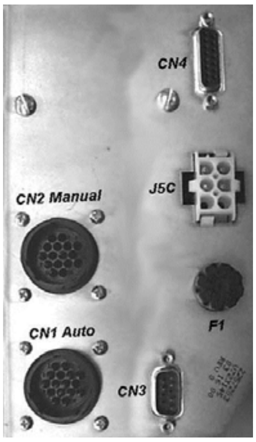
Note: ***The following pictures show cable connector location.***

Refer to OTS service manual for detailed OTS schematics.

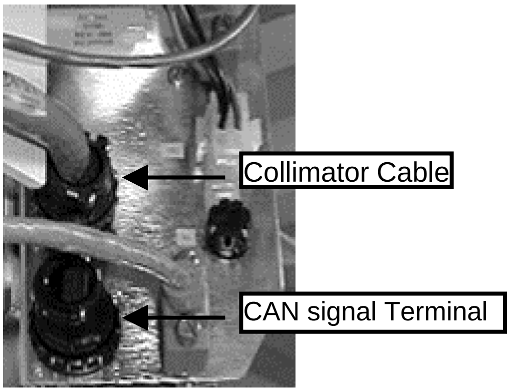
*1:



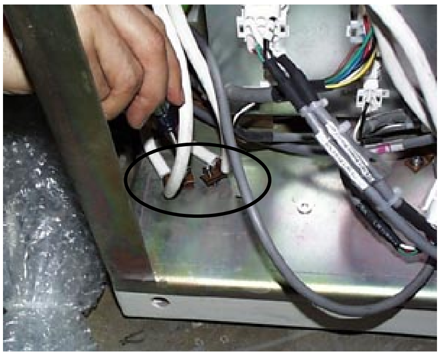
*2:


CN4
J5C
CN2 Manual
F1
CN1 Auto
CN3

Note: ***If use manual collimator, FE needs to connect Collimator power & CAN Cable to Manual Port (CN2), at the same time, plug the CAN signal terminal to Auto Port (CN1).***


Collimator Cable
CAN signal Terminal

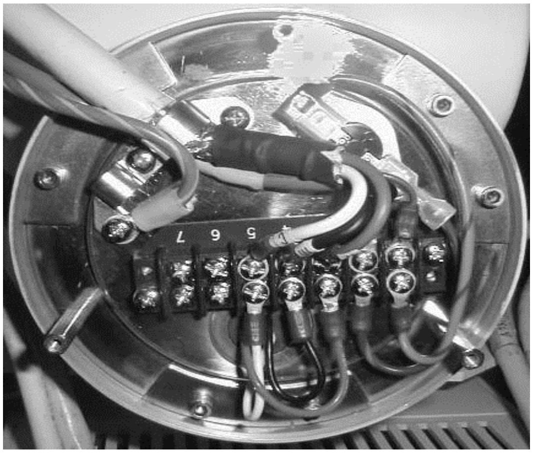
Note: ***Use P-clamps to hold the shield piece of AEC cable and fasten the two P-clamps on the bottom of the cabinet.***

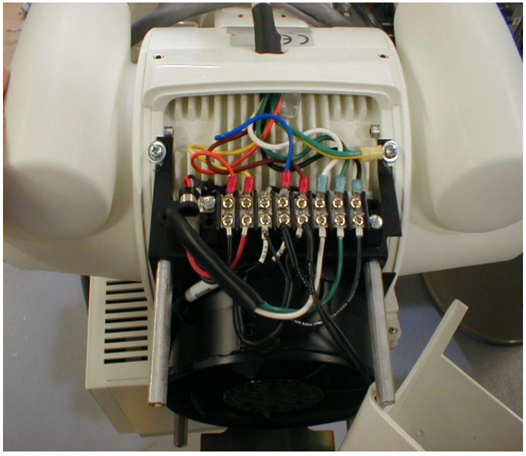


ANODE ROTATION STARTUP CABLE CONNECTION

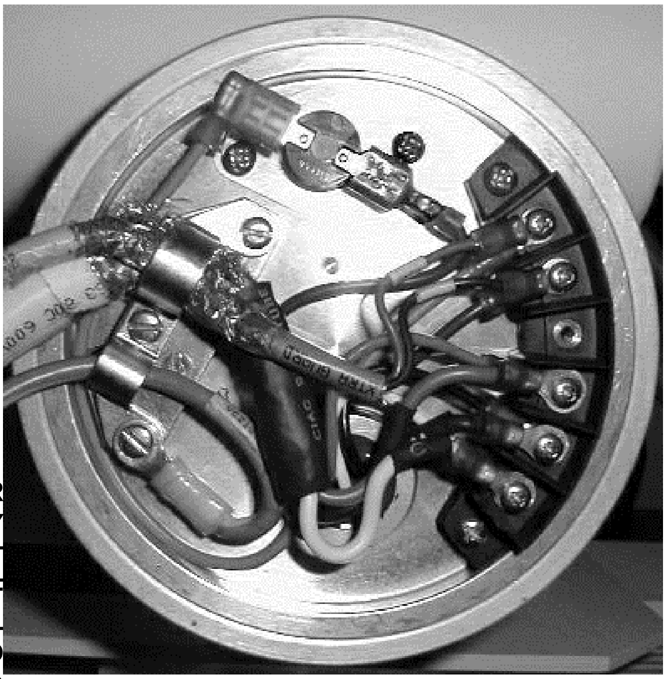
Note: ***Grounding wire must be connected properly.***

VARIAN X-RAY TUBE RAD-12, 14		KOUSHAL X-RAY TUBE MX100		
Anode rotation cable and Thermal Protection cable	Tube anode terminals	Connect point (count from the right side when facing the OTS)	Anode rotation cable and Thermal Protection cable	Tube terminals
C	5	1	Black (M)	Black
M	4	2	Green (A)	Green
A	3	3	White (C)	White
SW	1	4	TB1-4 (Black)	Brown, Black (group from pilot light), Black (group outing from the front hole)
SW	2	5	TB1-5 (White)	Five, Black (group from pilot light), Black
Rotation Cable outer Shield	Housing Clamp	6	-	Six, Black (group outing from the front hole), Black
Thermal Protection Cable Shield	Housing Clamp	7	THR2	Red
E	Housing Ground	8	THR1	Black





VARIAN X-RAY TUBE RAD-21	
Anode rotation cable and Thermal Protection cable	Tube anode terminals
White (C)	White
Black (M)	Black
Green (A)	Red
SW	Brown
SW	Brown-Orange
Rotation Cable outer Shield	Housing Clamp
Thermal Protection Cable Shield	Housing Clamp
E	Housing Ground



WARNING **DC BUS (+) IS ACTING AS INNER SHIELD, WHICH IS PROTECTED BY HEAT SHRINK TUBE. DON'T SHORTEN THE LENGTH OF ROTATION CABLE. MAKE SURE ALL THE CONNECTIONS AT TUBE HEAD ARE FASTENED ENOUGH TO SEPARATE THE INNER SHIELD AND GROUNDING.**

Note: ***For MX100 X-ray tube, pay attention to ground the tube grounding cable (Green-Yellow group) and tube fan shield grounding cable (labeled with "F3") to the tube casing. Refer to the illustration on prior page.***

Note: ***For Rad 14,21 X-ray tube, to avoid possible slipping, clamps must not be put over the plastic labels wrapped around the end of the stator cable. Remove the plastic labels when necessary. (See figures below)***

Note: ***For Rad 14,21 X-ray tube, when replacing the old tube with new one, the stator cable strain relief parts and Cable clamps used to fix the cables should be retained and re-installed to the new X-ray tube. (See figures below)***

Figure 1: RAD 14 X-ray Tube

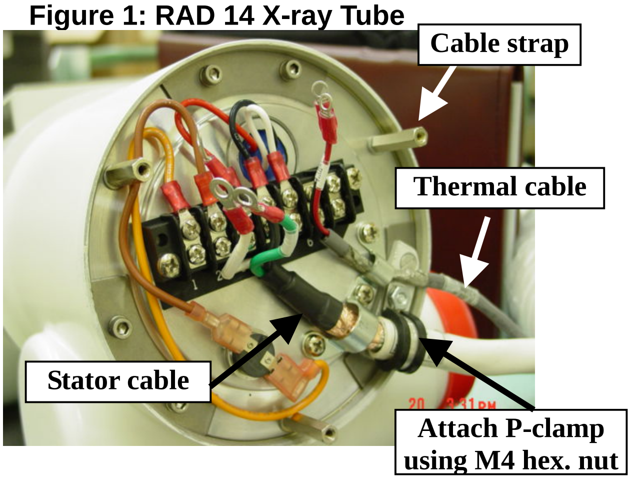
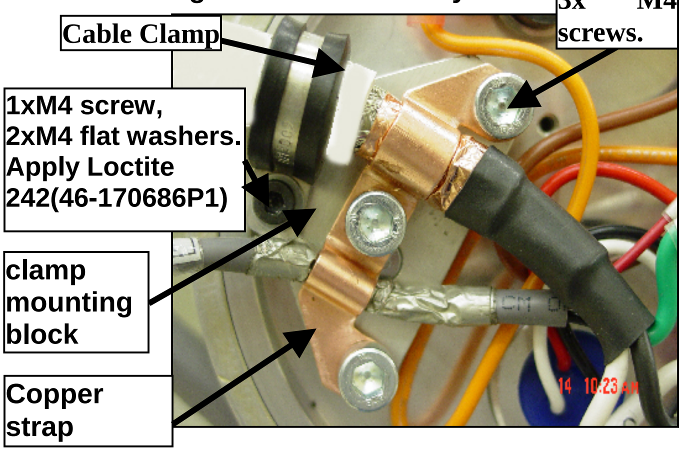

Cable strap
Thermal cable
Stator cable
Attach P-clamp using M4 hex. nut

Figure 2: RAD 21 X-ray Tube


3x M4 screws.
Cable Clamp
1xM4 screw,
2xM4 flat washers.
Apply Loctite 242(46-170686P1)
clamp mounting block
Copper strap

PROTEUS XR/A	**8/12**	**IST 020**

ANODE ROTATION STARTUP CABLE CONNECTION

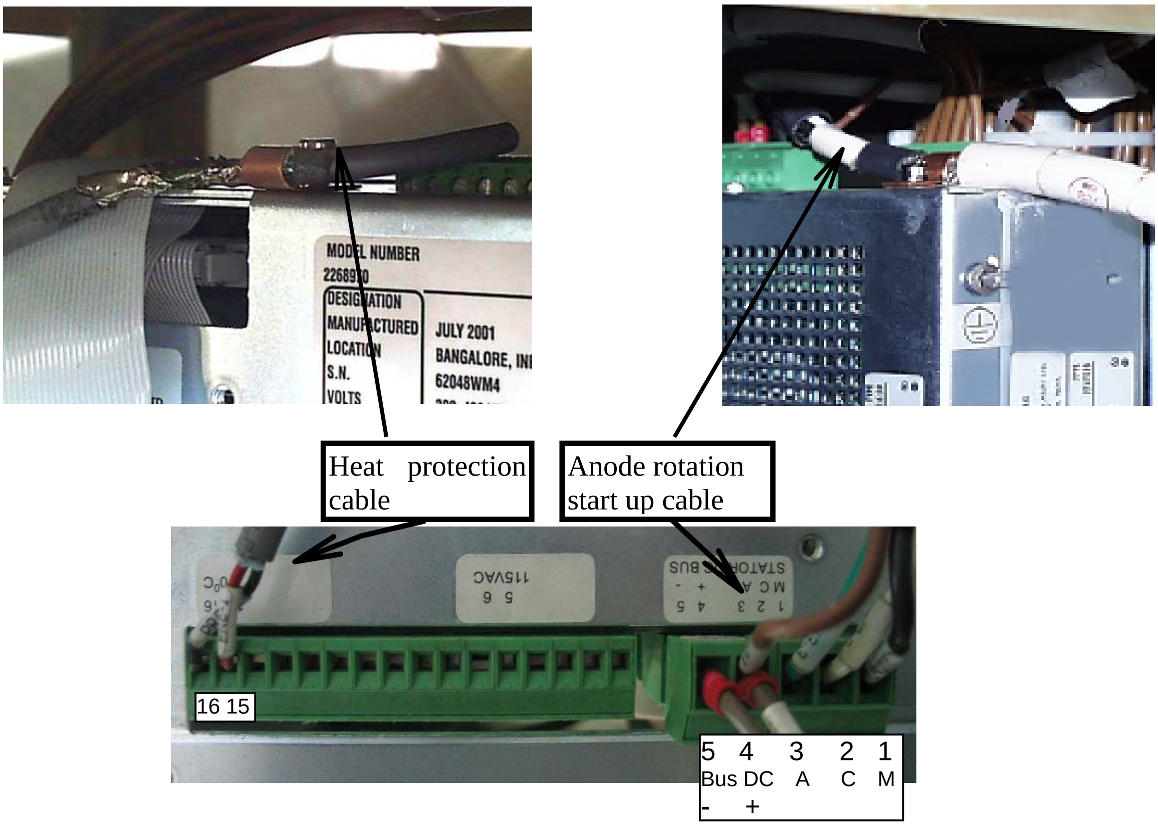
Note: ***Grounding wire must be connected properly.***

Jedi Generator Side	
Anode rotation cable and Thermal Protection cable	Jedi Generator Connector
2	J3 (2)
1	J3 (1)
3	J3 (3)
15	J2 (15)
16	J2 (16)
Rotation Cable outer Shield	E2
Thermal Protection Cable Shield	E1
Rotation Cable inner Shield	J3 (4) DC BUS plus (+)

Note: ***Please use the P-clamp (on the top of Jedi) to grounding the shield layer of the tube rotor cable and thermal cable.***

Make sure that cables should be placed at inner sides of the P-clamps, or else it will be difficult to fasten the bolts.

Make sure the P-clamps are tight enough so that they can contact with cable shield well.


Heat protection cable
Anode rotation start up cable
MODEL NUMBER
DESIGNATION
MANUFACTURED
LOCATION
S.N.
VOLTS
JULY 2001
BANGALORE, INI
62048WM4
16 15
5 4 3 2 1
Bus DC A C M
- +

Note: ***Make sure the brown wire from inner shield is connected to J3 (4) DC BUS (+)"***

PROTEUS XR/A	9/12	IST 020

BUCKY CABLE CONNECTION

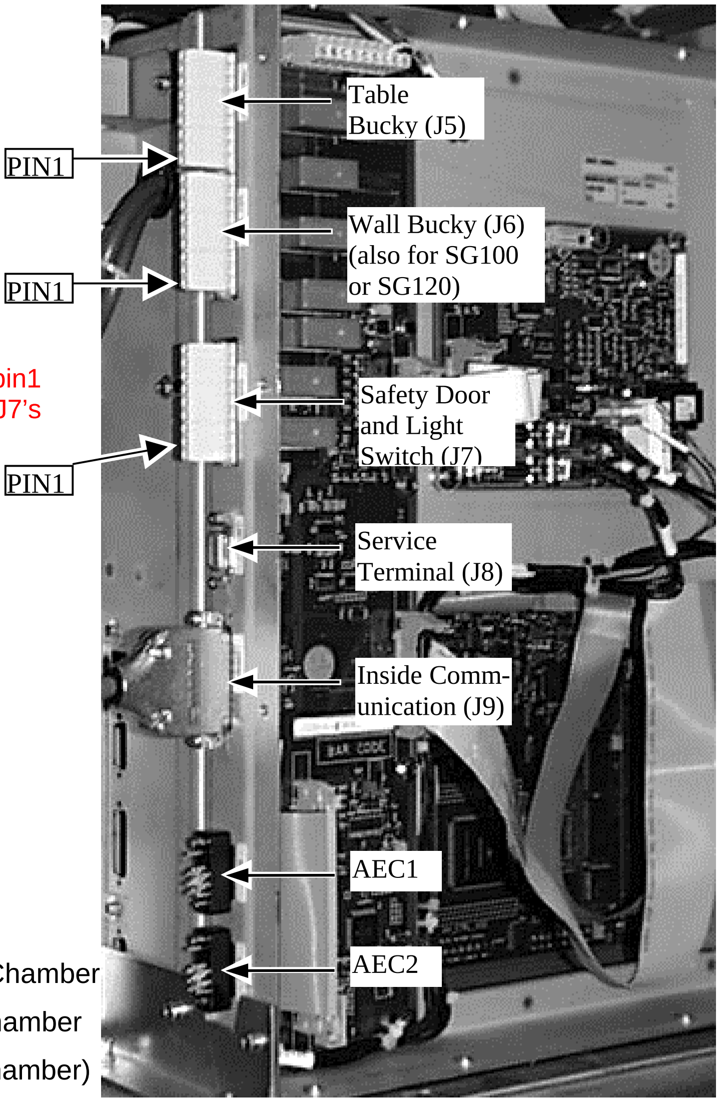


Table Bucky (J5)
PIN1
Wall Bucky (J6) (also for SG100 or SG120)
PIN1
Safety Door and Light Switch (J7)
PIN1
Service Terminal (J8)
Inside Communication (J9)
AEC1
AEC2

SAFETY DOOR AND LIGHT SWITCH

For the Safety Door, connect the connector J7's pin1 and pin2; for door light, connect the connector J7's pin4 and pin6. Refer to page 10-32 for details.

Maximum Ratings for Door Light Power: 250V/2A

NOTICE

We suggest to use the shield cables as the Safety Door and Light Switch cables, and their shield layer should grounded to the system ground.

AEC CABLES CONNECTION

- AEC1: Table Ion Chamber
- AEC2: Wall Stand (GPCP No. 600-0301) Ion Chamber

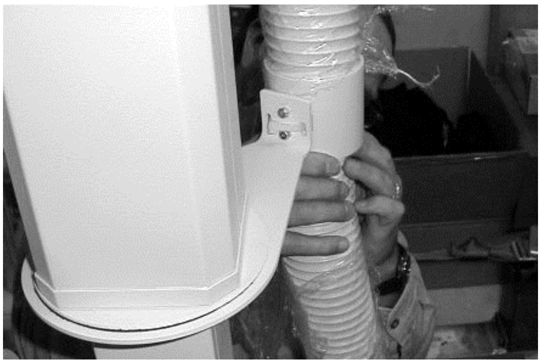
(or SG100 Wall Stand (GPCP No. 2225849) Ion Chamber

or SG120 Wall Stand (GPCP No. 2402562) Ion Chamber)

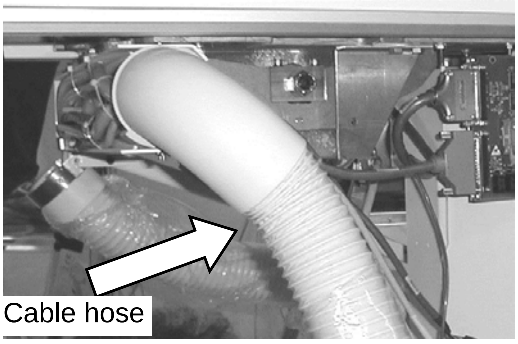
PROTEUS XR/A SYSTEM	10/12	IST 020

CABLE HOSES CONNECTION

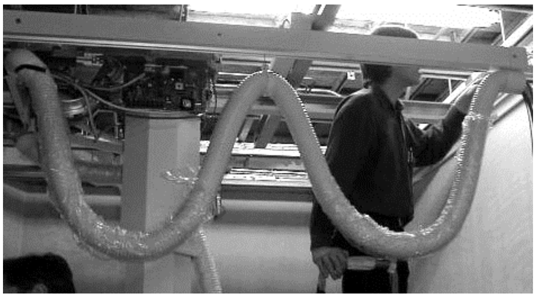
1. Use ty-rap to attach the cable and hose to the telescopic column.



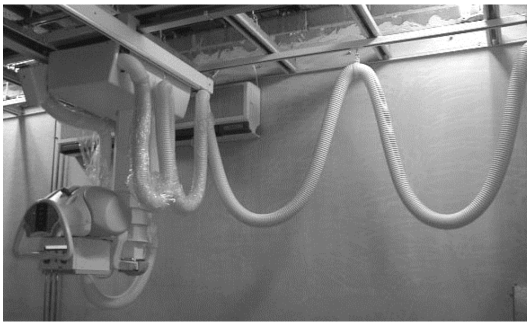
2. Put excess cables back into cable hose.



3. Hang the cable hose along stationary rail and make sure OTS bridge can move freely.

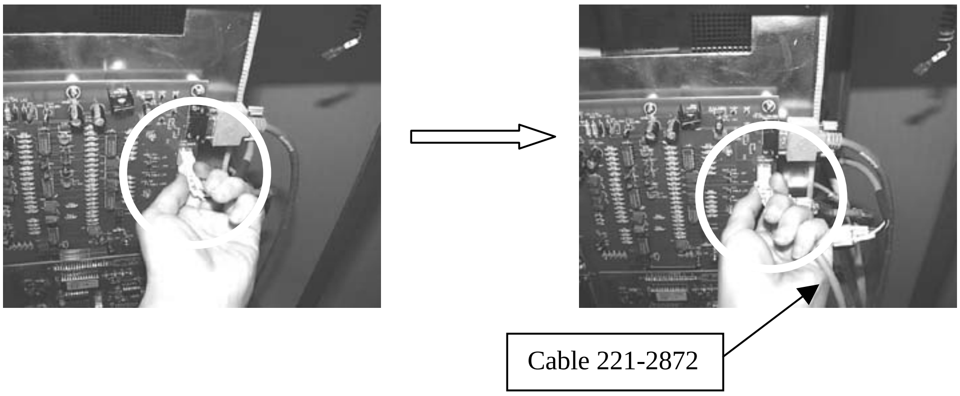


4. Put the excess cables into floor duct or ceiling.

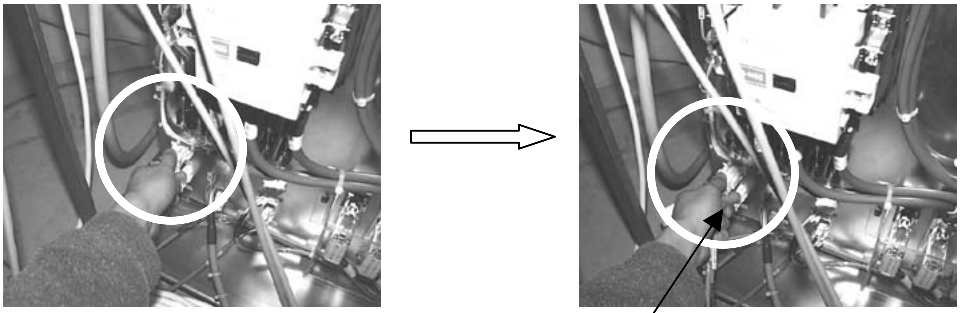


PRINTER CABLES CONNECTION (UPGRADE)

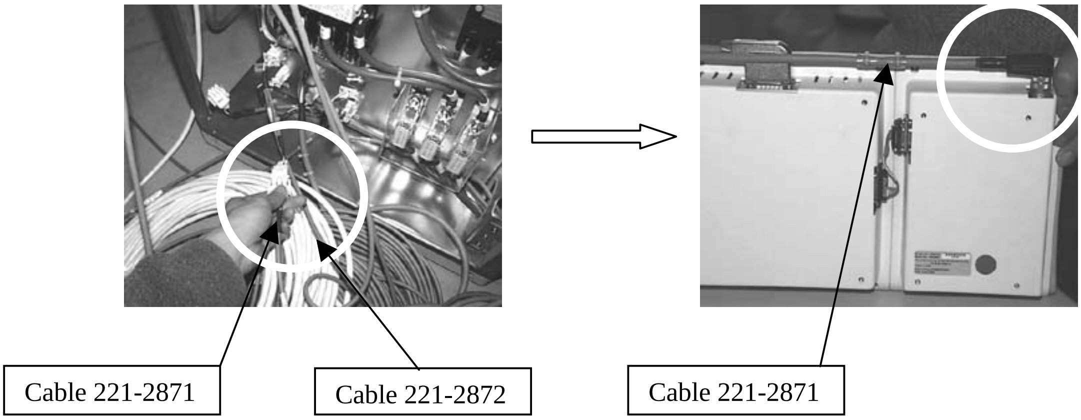
1. Unplug the connector on the socket J120 on the I/F board, plug the connector of the cable 221-2872.


Cable 221-2872

2. Unplug the connector on the socket J15 of the PDU, plug the other connector of the cable 221-2872.

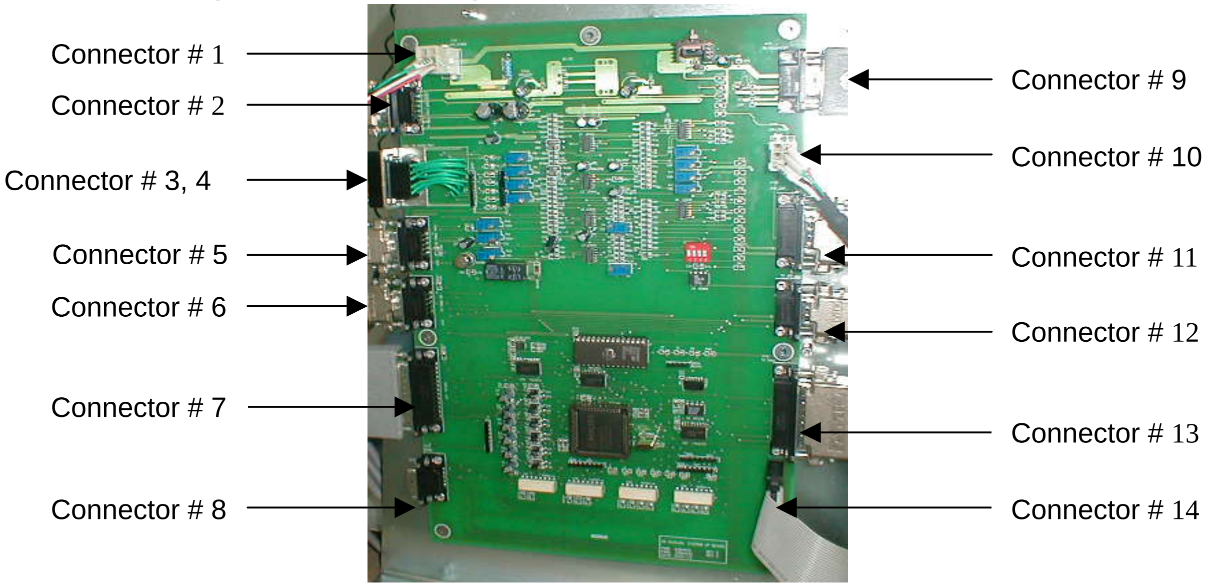

Cable 221-2872

3. Connect the cable 221-2872 with the cable 221-2871.
   Connect the cable 221-2871 with the printer.


Cable 221-2871
Cable 221-2872
Cable 221-2871

PROTEUS XR/A SYSTEM	12/12	IST 020

SYSTEM I/F BOARD (GPCP NO. 2375230) ELECTRICAL CONNECTION


Connector # 1
Connector # 2
Connector # 3, 4
Connector # 5
Connector # 6
Connector # 7
Connector # 8
Connector # 9
Connector # 10
Connector # 11
Connector # 12
Connector # 13
Connector # 14

Connector #	Cable Name	GPCP No.	Connector Mark	Other end
1	System I/F Power Cable	221-2886	J114	PDU CN16
2	Wall Stand (GPCP No. 600-0301) cassette size sensing Cable	2259298-58	J113	Wall Stand
3	SG100 Wall Stand (GPCP No. 2225849) Auto Tray Cable	2145644-2	J124	SG100 Wall Stand
4	SG120 Wall Stand (GPCP No. 2402562) Auto Tray Cable	2145644-2	J124	SG120 Wall Stand
5	Table cassette size sensing Cable	2259298-58	J112	Table Cassette Tray
6	Table height sensing Cable	2259298-56	J110	Table
7	OTS SID & TOMO I/O Cable (2m/3m)	2258388/2258388-2	J111	OTS J101
8	(optional)		J123 (CAN port)	
9	OTS CAN Cable (2m/3m)	2258389/2258389-2	J116	XT CN3
10	System I/F Board J120-PDU CN15 Cable	221-2893	J120	PDU CN15
11	System Console Signal -Power Cable (Supplier No. :2259977)	2259298-60	J119	System Console
12	System I/F Board – Jedi CAN Cable	221-2888	J118	Jedi CAN
13	System I/F Board-TOMO Cable	221-2734	J115	Tomo I/F Board P2
14	System I/F Board – Jedi Signal Cable	221-2887	J117	Jedi I/F J1

PROTEUS XR/A		**1/1**	**IST 021**
Subassembly: **Align Table Bucky with Proteus XR/a Collimator / Eclipse Proteus Collimator**			
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/1999**
NF No.	*Production date*	*Serial No.*	*Personnel: 1*
	From / / *To / /*	*From* *To*	*Time:* **1h**

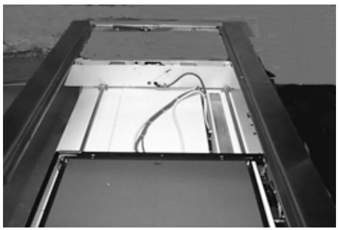
Table Bucky and Proteus XR/a Collimator/Eclipse Proteus Collimator Alignment

Note: ***The front panel of the wall stand is removable, so before this step, perform wall stand panel alignment calibration first.***

Note: ***The following procedures for Table Bucky/Collimator Alignment may require slight repositioning of the table base. This movement may affect the position or arrangement of the levelling plates, requiring an additional check prior to the final table mounting.***

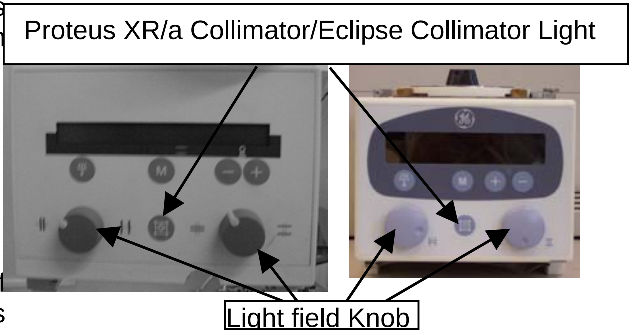
Note: ***Collimator calibration, OTS/collimator alignments and collimator light field to x-ray field adjustments, as described in their respective manuals, must be performed prior to the following procedure.***

WARNING **MAKE SURE ALL CABLE CONNECTIONS ARE CORRECT AND ALL GROUND WIRES ARE FASTENED. DAMAGE TO EQUIPMENT COULD OCCUR IF COMPONENTS ARE NOT PROPERLY SET BEFORE INITIAL UP.**



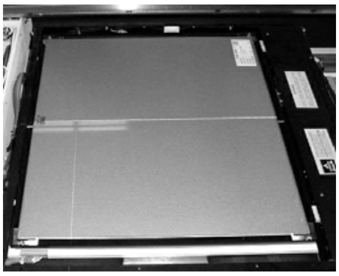
1. If the table top is installed, remove the table top (keep table top frame on) by removing the two screws at each end of the table top underside. Then take the table top out of the frame.

2. With the collimator parallel to the table top, turn on the collimator light, and using the light field adjusting knobs on the collimator, reduce the light field to a narrow beam of light along the length of the table.



3. Position the collimator to approximately 24" SID. (Source-to-Image- Distance).

4. Move the entire table so that the longitudinal center of field beam is properly aligned with the two center marks on the bucky.



5. Move the OTS and bucky simultaneously to check for continuous alignment of the narrow beam of light to the center marks.

Note: ***Since the bucky has previously been “squared” to the bucky rails, any deviation from alignment may be due to inaccurate alignment of either the OTS or collimator. If necessary, repeat alignment procedures.***

Note: ***Light field to x-ray field alignment should be performed before this step.***

PROTEUS XR/A			1/1	IST 022
Subassembly: **Align Wall Bucky with Proteus XR/a Collimator (for Wall Stand (GPCP No. 600-0301) and SG100 Wall Stand (GPCP No. 2225849)), Eclipse Proteus Collimator (for SG120 Wall Stand (GPCP No. 2402562))**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **30 min**	

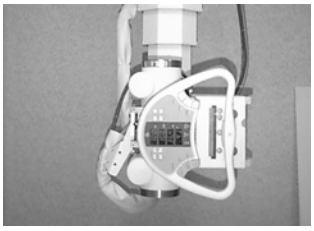
Note: ***Proteus XR/a Collimator, Eclipse Proteus Collimator, SG100 Wall stand and SG120 Wall Stand should follow the below contents.***

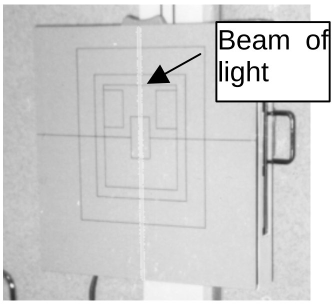
Wall Bucky and Proteus XR/a Collimator/Eclipse Proteus Collimator Alignment

Note: ***The following procedures for Wall Bucky/Collimator Alignment may require slight repositioning of the wall stand. This movement may affect the position or arrangement of the levelling plates, requiring an additional check prior to the final wall stand mounting. Collimator calibration, OTS/collimator alignments and collimator light field to x-ray field adjustments, as described in their respective manuals, must be performed prior to the following procedure.***

Note: ***For SG100 and SG120 Wall Stand, ensure the Bucky to be in vertical position before performing the following steps.***

1. Rotate the collimator towards wall bucky by pressing Ang. key on the OTS console.
2. With the collimator parallel to the wall bucky panel, turn on the collimator light and, using the light field adjusting knobs on the collimator, reduce the light field to a narrow beam of light along the length of the table.
3. Position the collimator to approximately 40" SID. (Source-to-Image-Distance).
4. Move and shim the wall stand so that the vertical centerline on the panel is properly aligned with the narrow beam of light.
5. Move the OTS to approximately 72" SID to check for continuous alignment of the narrow beam of light to the panel centerline.





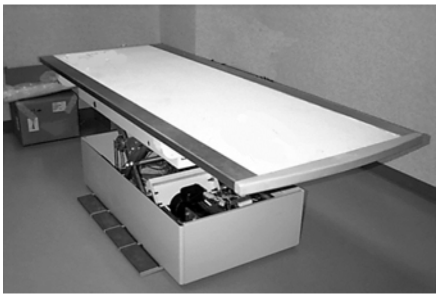
Note: ***Light field to x-ray field alignment should be performed before this step.***

PROTEUS XR/A			**1/3**	**IST 023**
Subassembly: **Mount Anchor bolts**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **20 min**	

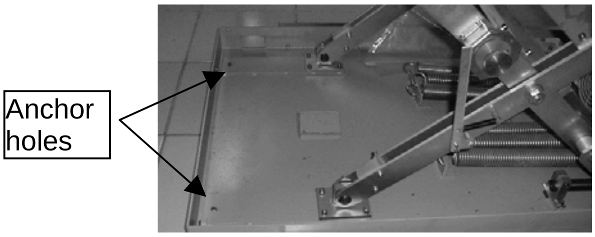
WARNING

AVOID POSSIBLE SEVERE INJURY!
TO PREVENT POSSIBLE SEVERE INJURY, AT LEAST TWO PEOPLE ARE REQUIRED TO MOVE THE TABLE OR WALL STAND.

1. Remove four table upper covers, from table base. If needed, remove lower covers too.



2. Drill four anchor holes for fasten table base. Mount expanding bolts in the table-base anchor holes. Use expanding bolts supplied in shipping bag.



3. Leave the bolts loose for levelling and shimming later.
4. Level the table base and shim as necessary with provided shims. If possible place shims close to the anchor bolts. Check longitudinal and transversal levelling with an extended level (such as a 3-foot or 1meter level) placed over table top.

Note: If shims added, be sure to add shims to foot pedal also.
Note: For SG100 Wall Stand, please skip to step 11 for the Anchor bolt mounting.
Note: For SG120 Wall Stand, please skip to step 17 for the Anchor bolt mounting.

5. Level the wall Bucky and shim as necessary with provided shims. After the table base levelling is verified, fasten the anchor bolts, then re-check levelling again and make final adjustments.

6. Fasten the wall stand to wall by supplied bracket. Refer to page 4-4 in Proteus XR/a Pre-installation manual for wall mount dimension.
7. Open the back cover of the wall stand.

8. Insert the cassette tray
9. Balance the counter weight of the cabinet
10. Assemble the back cover.

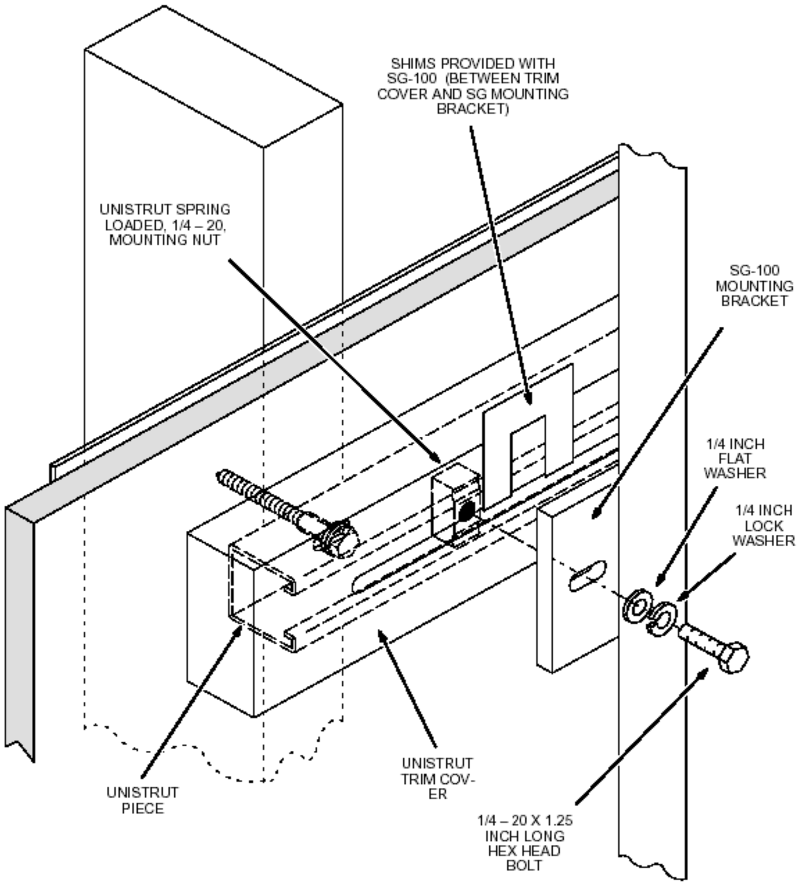
Note: For SG 100 Wall Stand, the Anchor bolt mounting should follow the steps from 11 to 16, instead of step 5 to 10.

Note: The procedures in following steps are concerted with the revision 6 of SG 100 Wall Stand Service Manual. For the reason of the update and change in that manual, it is recommended to see also the latest Service Manual of SG 100 Wall Stand for reference.

11. Using two people, carefully raise the SG 100 to an upright position.
12. Stand the SG100 against the wall and attach to the wall using the locally provided (6) wall anchors.
13. Align the SG100 laterally across the wall, to the X-Ray Tube Suspension beam or table centerline using the centerline marks on the wall and floor or the Laser Alignment Tool.

Note: The SG100 must be level on the wall with no more than 1/16 in. (1.5 mm) deflection to ensure that the anchors holding the SG100 to the wall does not come loose over time. Use the shims provided with the SG100 to ensure this requirement.

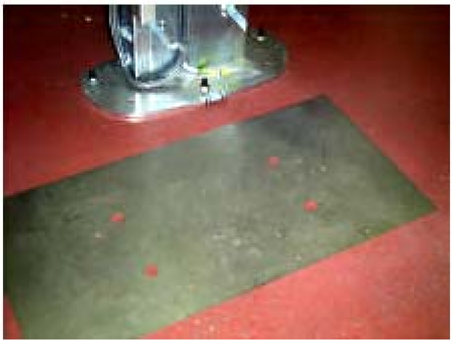
14. Verify the SG100 level across wall to ensure that no more than 1/16 in.(1.5mm) deflection exists, laterally or vertically. See following Illustration for recommended placement of the levels.
15. Insert supplied shims, as required, between the SG100 and the wall.
16. Tighten the six SG100 anchor bolts according to the torque specifications for the anchors.


SHIMS PROVIDED WITH SG-100 (BETWEEN TRIM COVER AND SG MOUNTING BRACKET)
UNISTRUT SPRING LOADED, 1/4 – 20, MOUNTING NUT
SG-100 MOUNTING BRACKET
1/4 INCH FLAT WASHER
1/4 INCH LOCK WASHER
UNISTRUT PIECE
UNISTRUT TRIM COV-ER
1/4 – 20 X 1.25 INCH LONG HEX HEAD BOLT

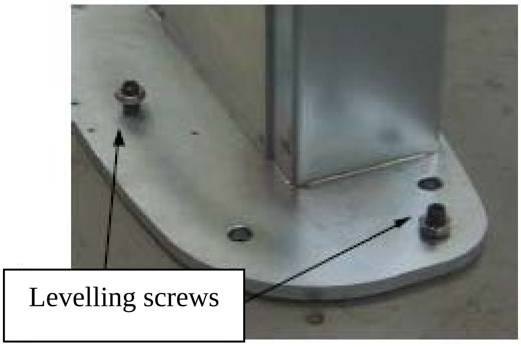
Note: ***For SG120 Wall Stand, the Anchor bolt mounting should follow the steps from 17 to 23, instead of step 5 to 10.***

Note: ***The procedures in following steps are concerted with SG120 Wall Stand Service Manual (P/N: S0012532). For the reason of the update and change in that manual, it is recommended to see also the latest Service Manual of SG120 Wall Stand for reference.***

17. Place SG120 at the distance focal dependant to the anti-diffusion grid.
18. Align SG120 laterally using the collimator light or the laser alignment tool.
19. Using the base template of SG120, mark the holes.



20. Move SG120 and drill the holes. Place the anchors.
21. Replace SG120 and place the anchor bolts.
22. Level the equipment using the 3 levelling screws and tight the bolts.



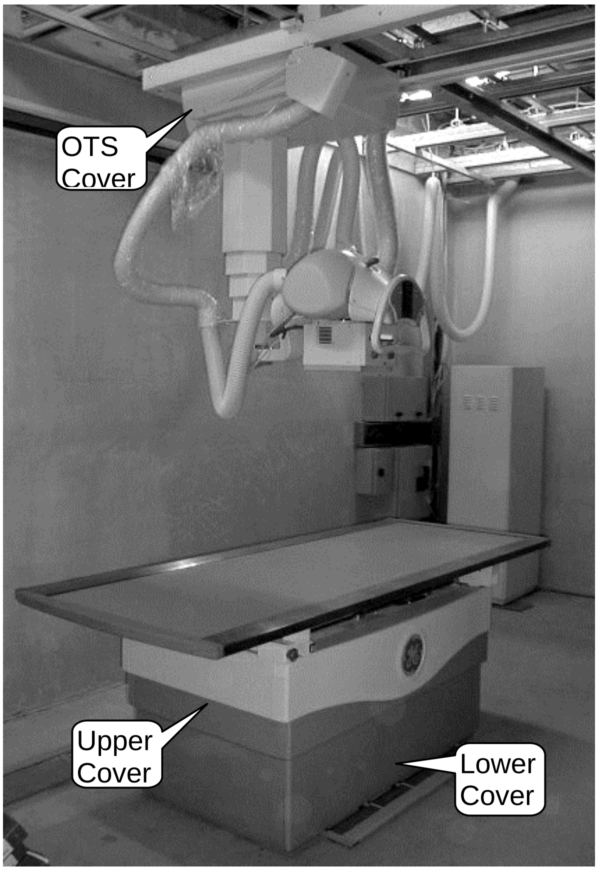
23. Recheck the alignment of SG120.

PROTEUS XR/A			**1/1**	**IST 024**
Subassembly: **Tomo-Link Assembly**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	From / / *To / /*	*From* *To*	*Time:* **3 hours**	

Note: ***For Tomo-Link installed with the system, refer to Job card IST 025 "Tomo-Link installation" in Chaper3.***

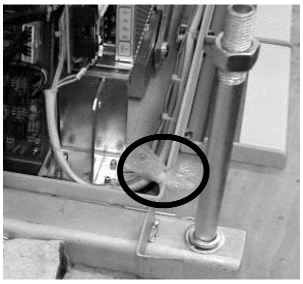
Step 4 to 8 are for Tomo-link updating procedure.

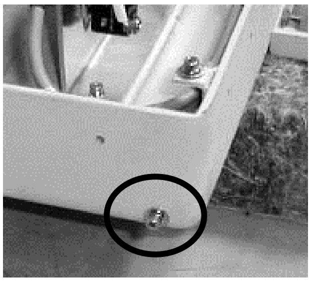
PROTEUS XR/A			**1/7**	**IST 025**
Subassembly: **Installation Check**				
Purpose: Installation Procedure			*Version no.* 0 *Date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **40 min**	



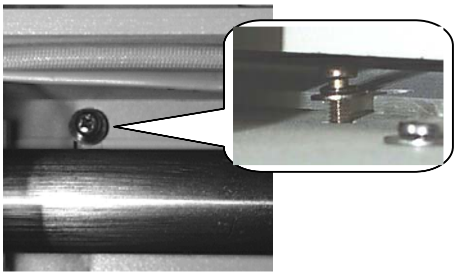
1. If table top was already installed, remove it first.
2. Mount the table lower covers, and then mount upper covers on.

Note: ***Lower side cover mount screws are attached to the table bottom plate.***



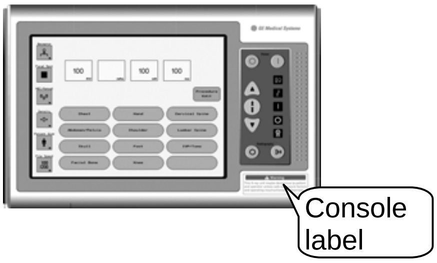


Note: ***When mounting right and left upper side cover, loosen the mount screws, then insert the side cover along the mount slot.***



Note: ***Adjust the upper covers' position to make sure upper covers will not scratch with lower covers when elevating the table. Then tighten all screws.***

3. Mount the table top and fasten the four screws under the table top.
4. Mount OTS carriage cover.

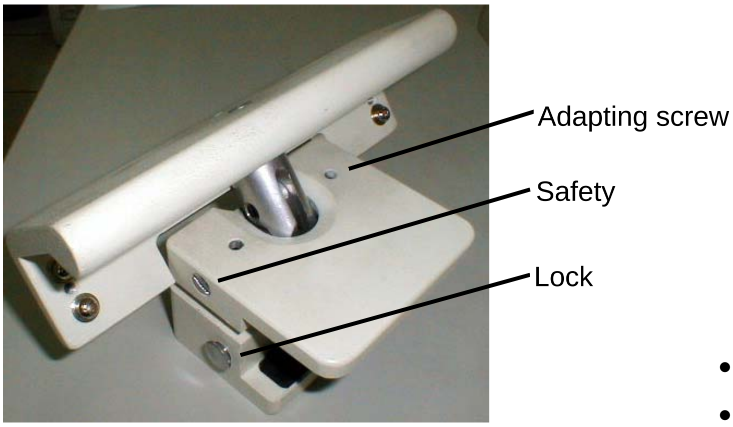


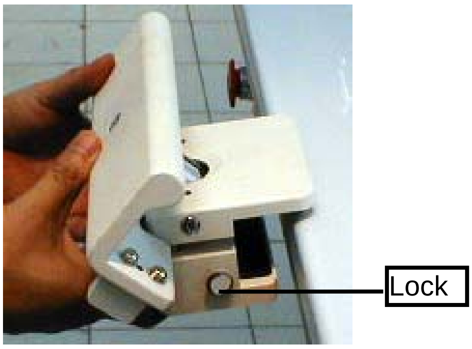
5. Clean table, console, wall stand (GPCP No.: 600-0301) (or SG100 Wall Stand (GPCP No.: 2225849), or SG120 Wall Stand (GPCP No.: 2402562)) and OTS suspension surfaces.

6. Paste the console label provided with the equipment according to local regulation.

Note: ***After completing installation, remove vinyl protective films from table top and pedals.***

7. Abdomen Compression Band Installation

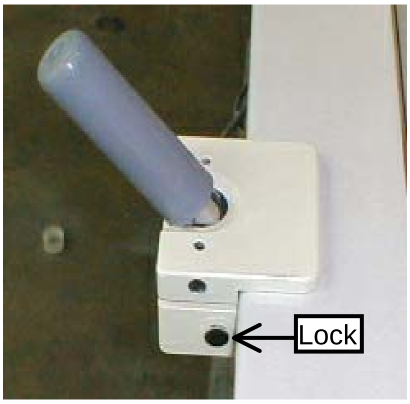




- Depress the lock, then release clamp.
- Position the clamp, then depress the handle.
- Fasten the compression band.

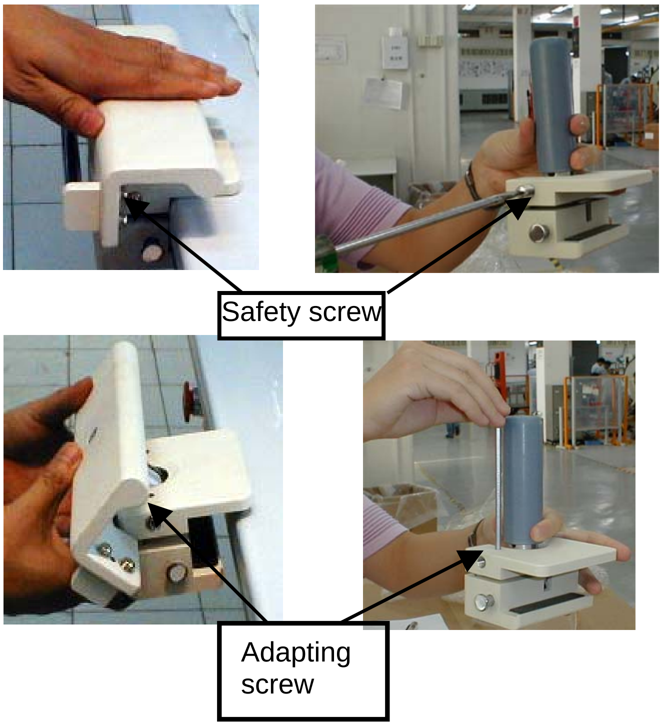
8. Patient Hand Grips

The patient hand grip installation is as same as compression band clamp.



9. Adjusting

- Depress the lock, then release clamp or grip.
- Position the clamp or grip, then depress the handle.
- Release two safety screws.
- Use M2.5 allen key adjust two adapting screws until clamp is firmly attached to table top
- Fasten safety screws.



10. Collimator Cone

Note: ***The following contents fit to both Proteus XR/a Collimator and Eclipse Proteus Collimator.***

Note: ***The purpose of the collimator cone is to collimate the beam and image to a cylinder shape when doing certain procedures. Mainly used for sinuses, head, hip etc.***

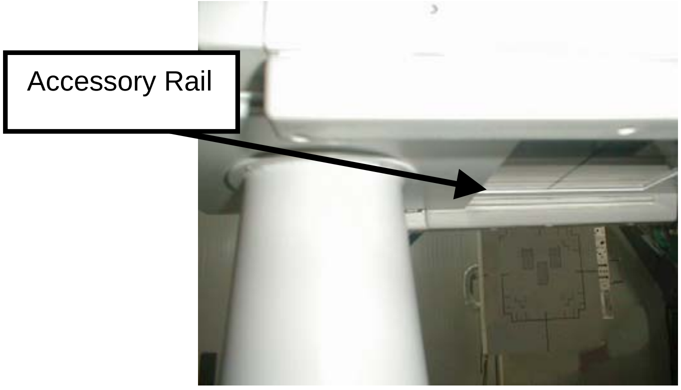
Procedure of attach and removal:

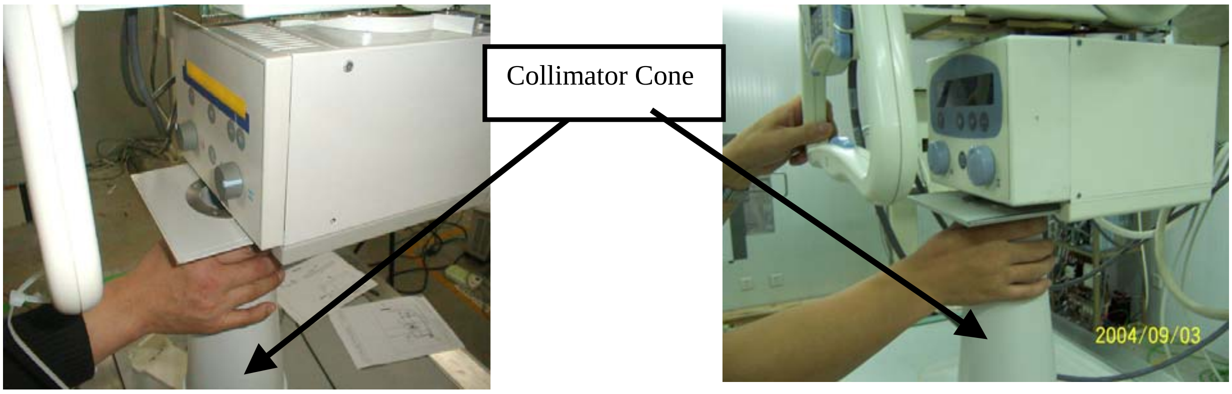
I. Insert the edge of the collimator cone into the Accessory Rails beside the collimator window.

CAUTION **Insert collimator cone into the upper accessory rail.**

Note: ***Adjust the alignment of the collimator cone with the collimator to ensure the concentricity of the collimator cone and collimator window.***

CAUTION **When taking exposure using the collimator cone, pay attention to choose correct cassette size to avoid the X-ray field to beyond the film size.**

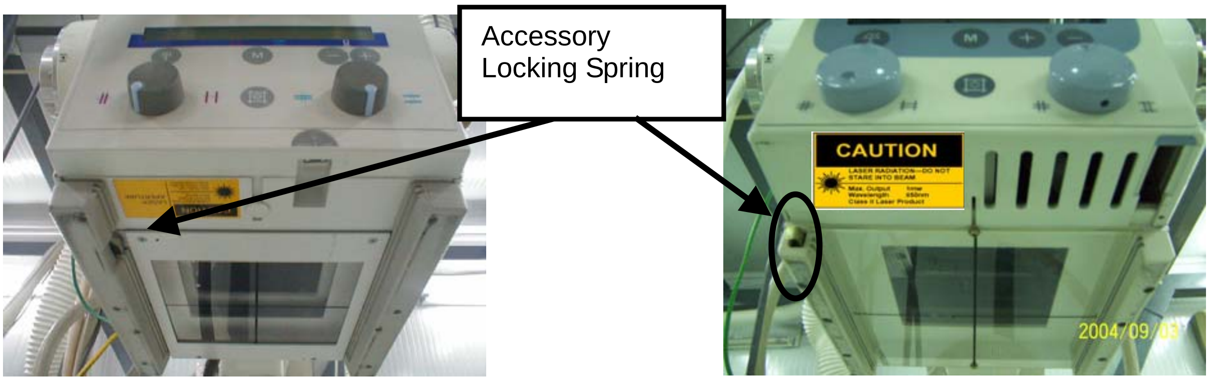




Proteus XR/a Collimator

Eclipse Proteus Collimator

ii. For removal, push in the Accessory Locking Spring and remove the collimator cone.



For Proteus XR/a Collimator

For Eclipse Proteus Collimator

Note: ***If choose SG120 Wall Stand, please refer to the following contents.***

11. Patient Support

Installation

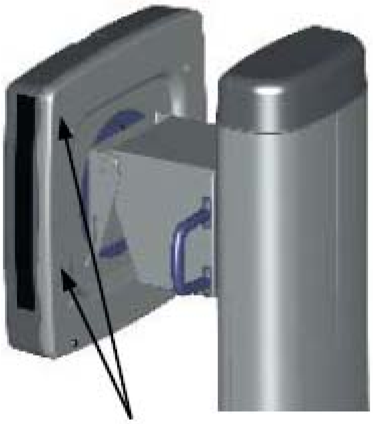
Tools required:

- Standard service person tool kit.

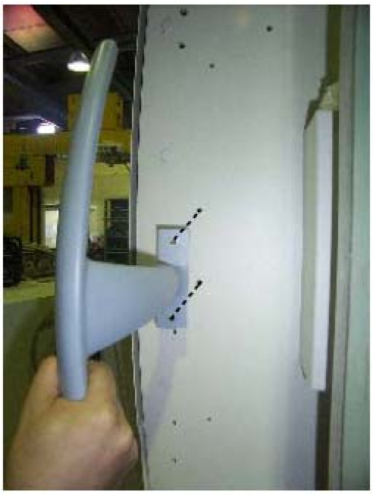
Procedure

1) Do not discard any packing material such as envelopes, boxes, bags until all parts are compared against the packing list.
2) Check the general condition and external appearance of all parts for possible damage or missing items. Notify the distribution center immediately of any damage or missing parts.

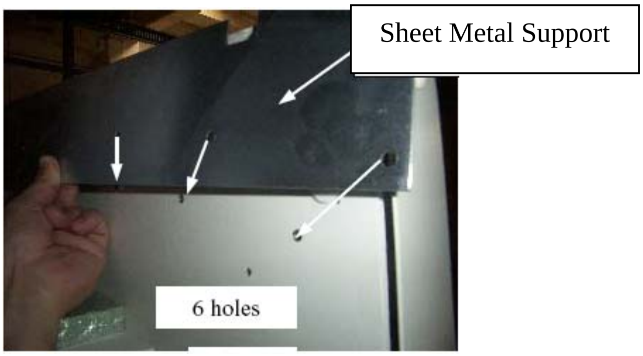
3) Remove the back covers of the bucky support assembly.



4) Install patient handgrips.
Assembly with the supplied screws in the kit the 2 hand grips (one on each side) in the holes marked in the figure below.

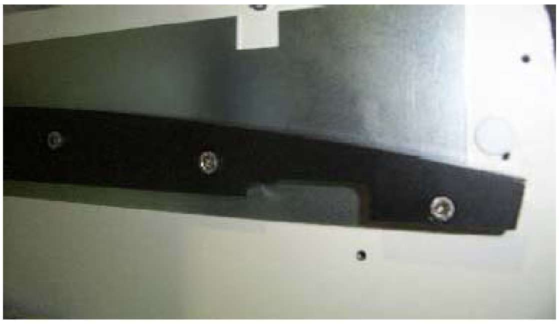


5) Install lateral bar.
   a. Assembly the sheet metal support to the bucky support assembly (6 screws).

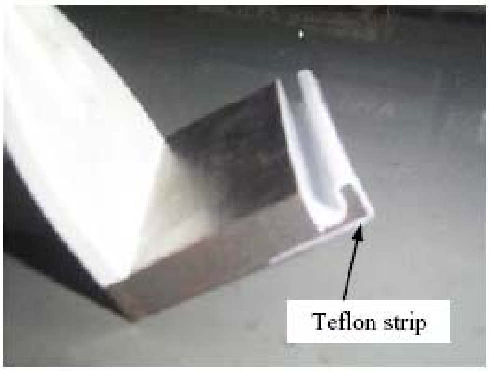


PROTEUS XR/A SYSTEM	6/7	IST 025

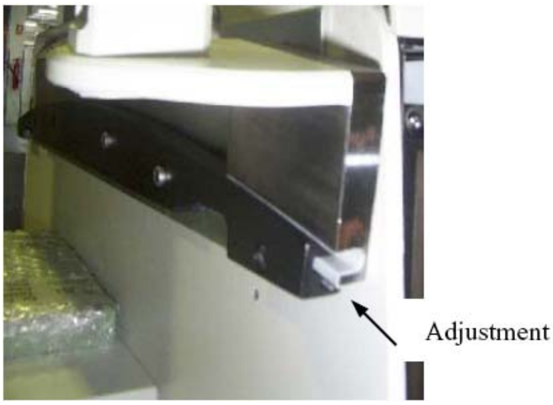
b. Assembly the slide track to the sheet metal support.

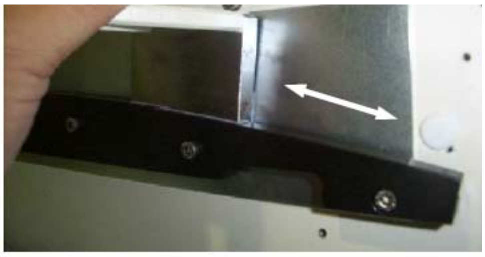


c. Take the lateral bar steel weldment assembly and the Teflon strip that is supplied with the kit and apply it with adhesive along the contact surface between the steel weldment assembly and the slide track.

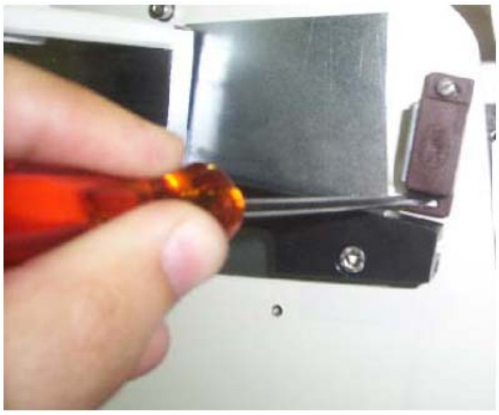


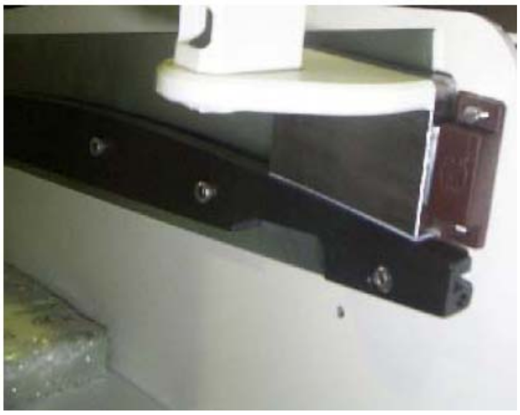
d. Fit the steel weldment assembly to the slide track and make sure it can be displaced along the whole track.



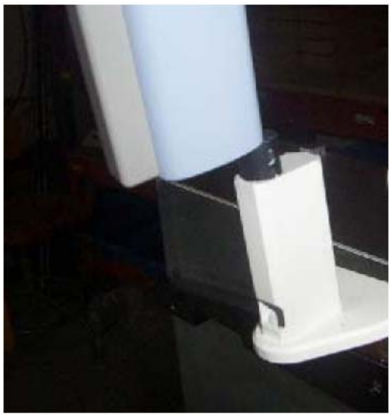


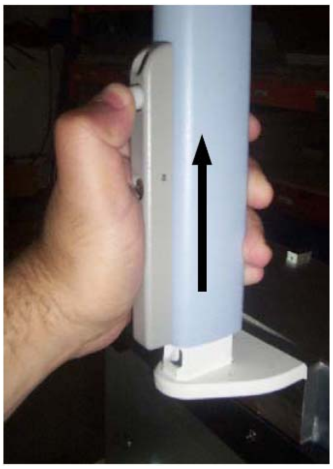
e. Assembly the two magnets (one on each side) included in the kit to the bucky support. The magnets will lock the inertial sliding movement when the bucky assembly is rotated, in the case of SG120.





f. Put the lower back cover removed in step 3).
g. Assembly the upper back cover included in the kit.
h. Fit the lateral bar assembly in the steel weldment assembly on the left of the figure below.





i. To remove the lateral bar, press the key on the lateral bar assembly and extract it by pulling up on the right of the figure above.

6) Add the needed counterweight included in the kit and proceed to counterbalance the bucky and bucky carriage as described in step 5 in Jobcard IST 009.

PROTEUS XR/A			**1/3**	**IST 033**
Subassembly: **Spanish Language Labels**				
Purpose: System Installation			*Version no.* 0 *Date:* **02/06/03**	
NF No.	*Production date*	*Serial No.*	*Personnel: 1*	
	From / / *To / /*	*From* *To*	*Time:* **10minutes**	

Note: ***For Systems installed at Spain, the Spanish language labels must be applied on sites to cover the English description area on the English labels attached at the factory.***

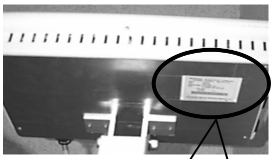
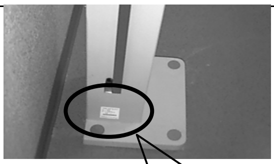
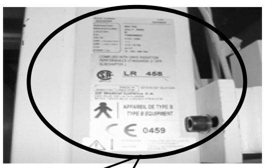
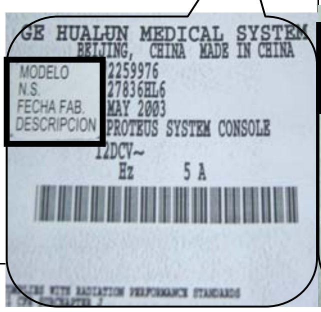
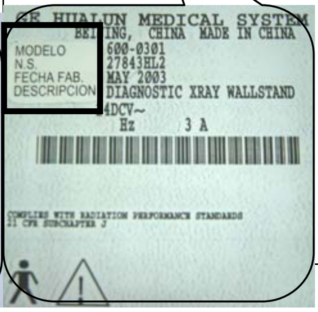
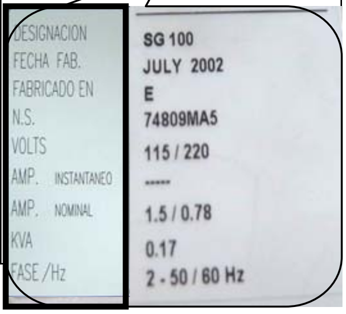
1. Pick up the plastic package marked “2382506” from Accessories crate #4, box 4-6.
2. Attach the Spanish labels to cover the description area of the English labels on the subassemblies according to the forms below.

Form1 Spanish Label Package (Part No. 2382506) Contents

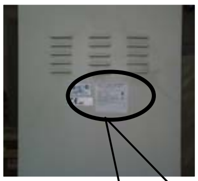
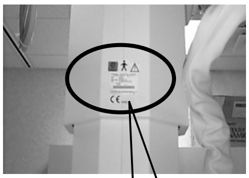
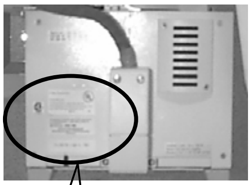
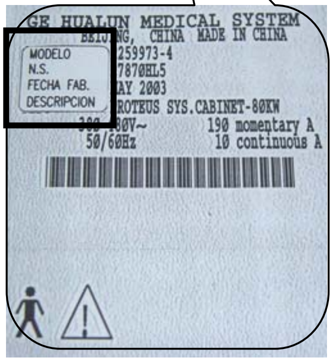
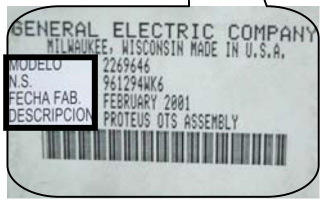
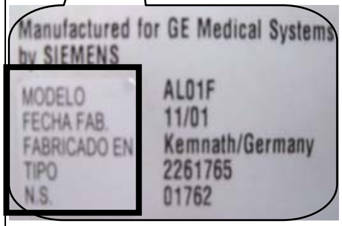
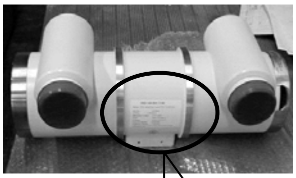
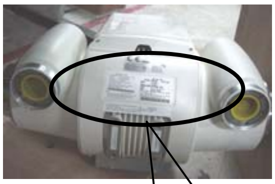
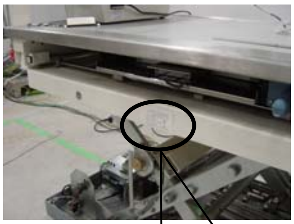
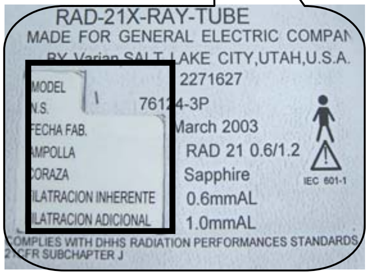
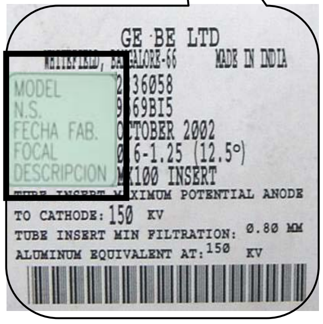
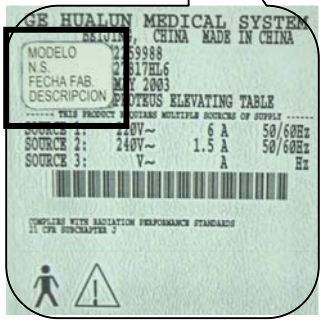
Note: ***For backup, the quantity of the labels is more than the least number needed to be applied.***

Item #	Label Part Number	Quantity	Applied Subassembly
1	2382338	9	Table
			Wall Stand (GPCP No. 600-0301)
			OTS
			Cabinet
			System Console
2	2382341	2	Proteus XR/a Auto Collimator
3	5116700	9	Eclipse Proteus Collimator
4	2382340	2	X-ray Tube (RAD-14/21)
5	2384005	2	X-ray Tube (MX 100)
6	2384006	2	SG100 Wall Stand （GPCP No. 2225849）

Form2 Spanish Label Designation

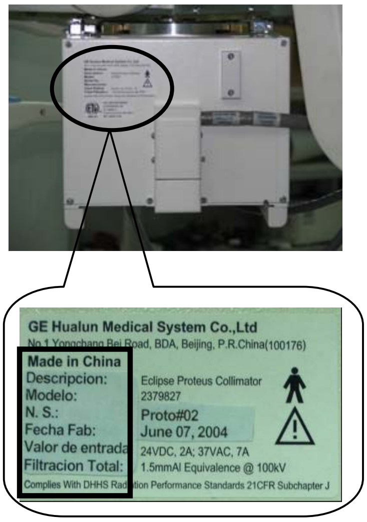
DESIGNATION	System console	Wall Stand (GPCP No. 600-0301）	SG 100 Wall Stand （GPCP No. 2225849）
SPANISH LANGUAGE LABELS PART NO.	2382338	2382338	2384006
LOCATION OF NAME PLATE			
LOCATION OF SPAIN LANGUAGE LABELS	 GE HUALUN MEDICAL SYSTEM BEIJING, CHINA MADE IN CHINA MODELO 2259976 N.S. 27836HL6 FECHA FAB. MAY 2003 DESCRIPCION PROTEUS SYSTEM CONSOLE 12DCV~ Hz 5 A	 GE HUALUN MEDICAL SYSTEM BEIJING, CHINA MADE IN CHINA MODELO 600-0301 N.S. 27843HL2 FECHA FAB. MAY 2003 DESCRIPCION DIAGNOSTIC XRAY WALLSTAND 4DCV~ Hz 3 A COMPLIES WITH RADIATION PERFORMANCE STANDARDS 21 CFR SUBCHAPTER J	 DESIGNACION SG 100 FECHA FAB. JULY 2002 FABRICADO EN E N.S. 74809MA5 VOLTS 115 / 220 AMP. INSTANTANEO ----- AMP. NOMINAL 1.5 / 0.78 KVA 0.17 FASE /Hz 2 - 50 / 60 Hz

PROTEUS XR/A SYSTEM	**2/3**	**IST 033**

DESIGNATION	Cabinet	OTS radiographic suspension (2/3m)	Proteus XR/a Auto Collimator
SPANISH LANGUAGE LABELS PART NO	2382338	2382338	2382341
LOCATION OF NAME PLATE			
LOCATION OF SPAIN LANGUAGE LABELS	 GE HUALUN MEDICAL SYSTEM BEIJ NG, CHINA MADE IN CHINA MODELO 259973-4 N.S. 7870HL5 FECHA FAB. AY 2003 DESCRIPCION ROTEUS SYS.CABINET-80KW 80V~ 190 momentary A 50/60Hz 10 continuous A	 GENERAL ELECTRIC COMPANY MILWAUKEE, WISCONSIN MADE IN U.S.A. MODELO 2269646 N.S. 961294WK6 FECHA FAB. FEBRUARY 2001 DESCRIPCION PROTEUS OTS ASSEMBLY	 Manufactured for GE Medical Systems by SIEMENS MODELO AL01F FECHA FAB. 11/01 FABRICADO EN Kemnath/Germany TIPO 2261765 N.S. 01762
DESIGNATION	X-ray Tube (RAD-14/21)	X-ray Tube (MX 100)	Table
SPANISH LANGUAGE LABELS PART NO	2382340	2384005	2382338
LOCATION OF NAME PLATE			
LOCATION OF SPAIN LANGUAGE LABELS	 RAD-21X-RAY-TUBE MADE FOR GENERAL ELECTRIC COMPAN BY Varian SALT LAKE CITY,UTAH,U.S.A. MODEL 2271627 N.S. 761 4-3P FECHA FAB. March 2003 AMPOLLA RAD 21 0.6/1.2 CORAZA Sapphire ILATRACION INHERENTE 0.6mmAL ILATRACION ADICIONAL 1.0mmAL IEC 601-1 OMPLIES WITH DHHS RADIATION PERFORMANCES STANDARDS 2 CFR SUBCHAPTER J	 GE BE LTD WHITEFIELD, BA GALORE-66 MADE IN INDIA MODEL 2 36058 N.S. 9 69BI5 FECHA FAB. OCTOBER 2002 FOCAL 0 6-1.25 (12.5°) DESCRIPCION X100 INSERT XIMUM POTENTIAL ANODE TO CATHODE: 150 KV TUBE INSERT MIN FILTRATION: 0.80 MM ALUMINUM EQUIVALENT AT: 150 KV	 GE HUALUN MEDICAL SYSTEM BEIJI , CHINA MADE IN CHINA MODELO 2259988 N.S. 2 817HL6 FECHA FAB. M Y 2003 DESCRIPCION P OTEUS ELEVATING TABLE ------ THIS PRODUCT REQUIRES MULTIPLE SOURCES OF SUPPLY ------ SOURCE 1: 220V~ 6 A 50/60Hz SOURCE 2: 240V~ 1.5 A 50/60Hz SOURCE 3: V~ A Hz COMPLIES WITH RADIATION PERFORMANCE STANDARDS 21 CFR SUBCHAPTER J

PROTEUS XR/A SYSTEM	**3/3**	**IST 033**

DESIGNATION	Eclipse Proteus Collimator
SPANISH	5116700

LANGUAGE LABELS PART NO	
LOCATION OF NAME PLATE	
LOCATION OF SPAIN LANGUAGE LABELS	

GE Hualun Medical System Co.,Ltd
No.1 Yongchang Bei Road, BDA, Beijing, P.R.China(100176)
Made in China
Descripcion: Eclipse Proteus Collimator
Modelo: 2379827
N. S.: Proto#02
Fecha Fab: June 07, 2004
Valor de entrada 24VDC, 2A; 37VAC, 7A
Filtracion Total: 1.5mmAl Equivalence @ 100kV
Complies With DHHS Radiation Performance Standards 21CFR Subchapter J

PROTEUS XR/A		**1/1**	**IST 034**
Subassembly: **Korean Language Labels**			
Purpose: System Installation			*Version no.* 0 *Date:* **30/11/07**
NF No.	*Production date*	*Serial No.*	*Personnel: 1*
	From / / *To / /*	*From* *To*	*Time:* **10minutes**

Note: For Systems installed at Korea, the Korean language rating plate must be applied on sites.

1. Pick up the plastic package marked “5257355” from Accessories crate #4, box 4-6.
2. Attach the Korean rating plate to the location shown as below.

CHAPTER 3 SYSTEM UPGRADE OR REPLACEMENT

SECTION 1 TABLE OF JOBCARDS CONTENTS

Jobcard Number	Content	Version	Page
SW JEDI 41-3	AEC Board Option Installation	0	3-3
PROTEUS XR/A COLLIMATOR	Replacing the collimator D1 board, D2 board, Fuse, Tape Measure	1	3-6
ECLIPSE PROTEUS COLLIMATOR	Replace the whole collimator, collimator control board, user interface board, bucky centering light, LCD display, tape	1	3-12
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SECTION 2 JOBCARDS CONTENTS

PROTEUS XR/a			**1/3**	**SW JEDI 41-3**
subassembly: **AEC BOARD OPTION INSTALLATION**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 20*** **min**	

1 SUPPLIES

The following items are supplied:

- AEC board
- 1 flat cable
- 6 screws

2 TOOLS

5.5 mm nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

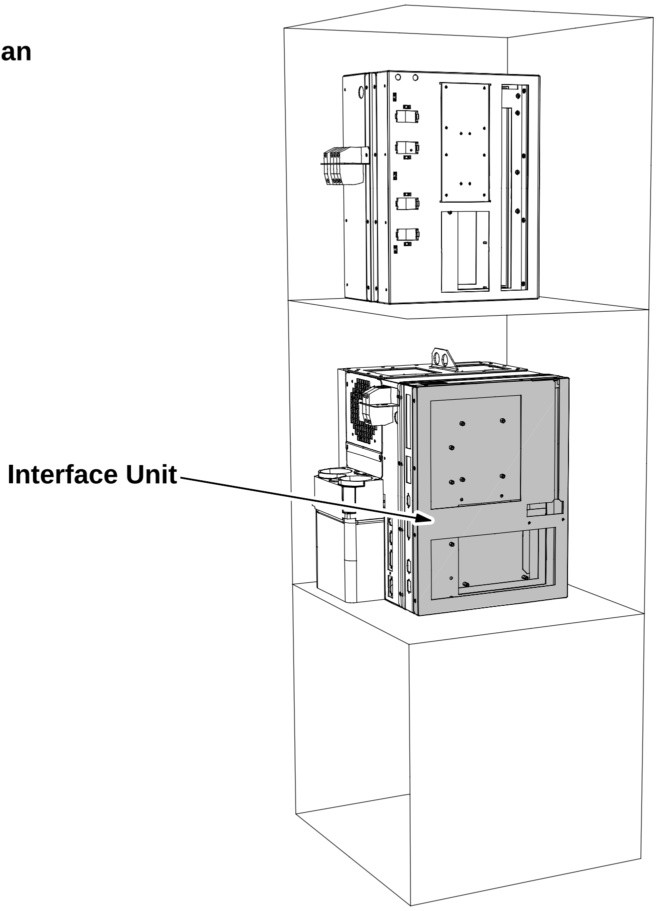
To protect the circuit boards, be sure to wear the antistatic bracelet.

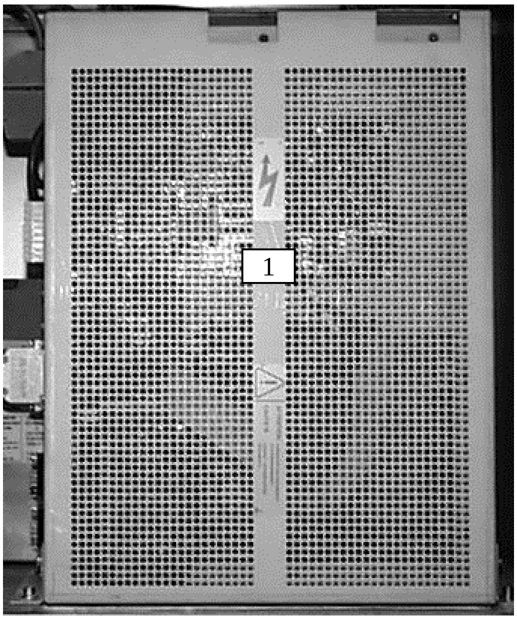
4 PREREQUISITES

None.

5 AEC BOARD INSTALLATION

NOTICE **The installation of the AEC Board can be done without removing the Interface Unit from the Cabinet.**





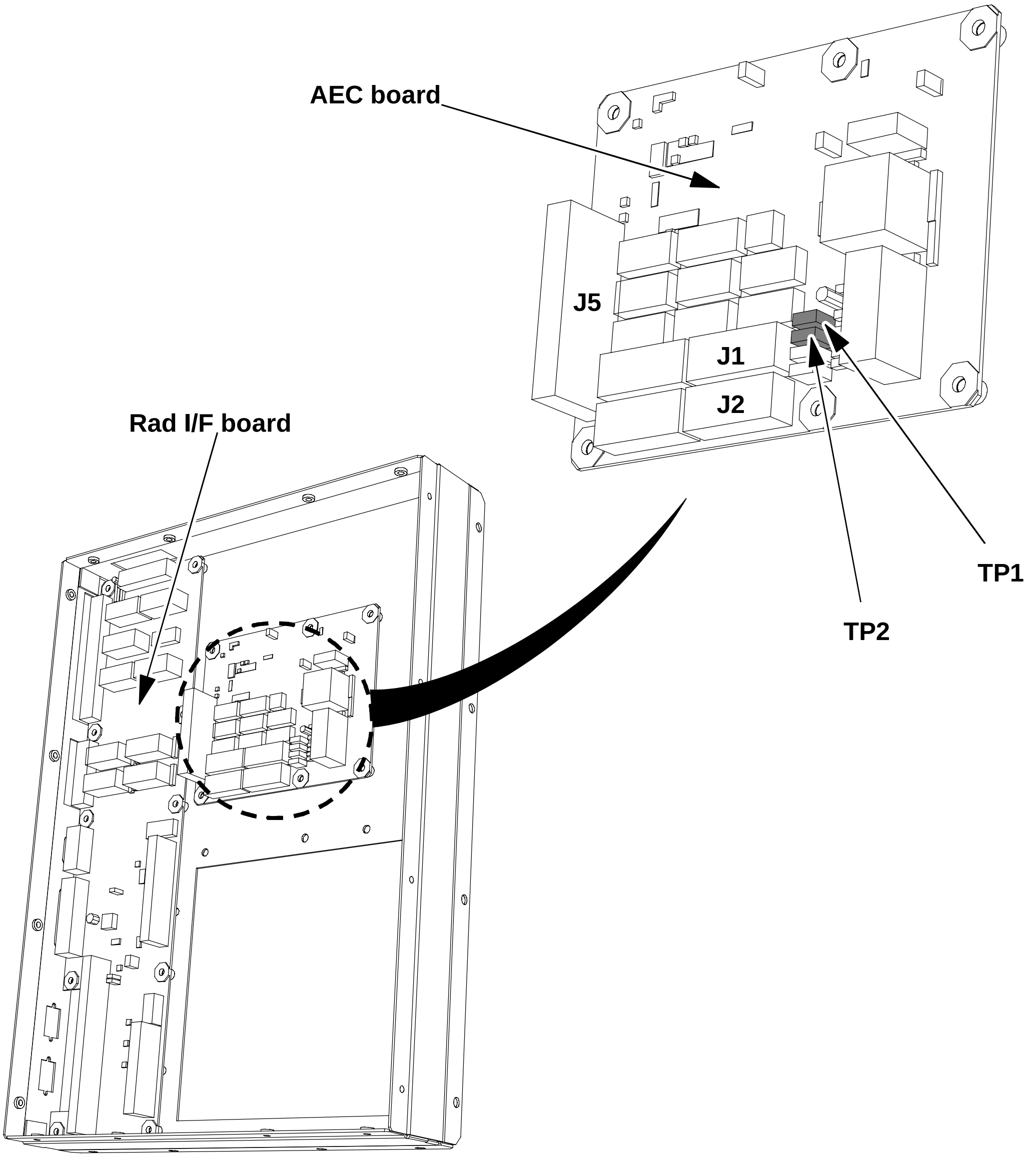
1. Unscrew twelve 5.5 mm screws that retain the cover panel and remove the cover 1.
2. Mount the AEC board to the plate with six screws
3. Connect the flat cable to connector J5 on the AEC board and to J3 on the I/F RAD Board.
4. Join connector J1 on AEC board to AEC 2 on the left side of this module.
5. Join connector J2 on AEC board to AEC1 on the left side of this module.

PROTEUS XR/a	3/3	SW JEDI 41-3

6. Join connector P230 come from wiring harness J1 to TP1 on AEC board

7. Join connector P230 come from wiring harness J2 to TP2 on AEC board

8. Remember to connect cable from ionization chambers to AEC1 and AEC 2.



6 REASSEMBLY

Remount the Front cover. Reverse the disassembly procedure.

PROTEUS XR/a			**1/6**	**PROTEUS XR/A COLLIMATOR**
subassembly: **Replacing the collimator D1 board, D2 board, Fuse, Tape Measure**				
purpose:			*version no*. 1 *date:* **31/08/01**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 30*** **min**	

1 THE D1 OR D2 DOARD ABNORMAL INDICATIONS

The Proteus automatic collimator AL01F is equipped with 2 electronic boards D1 and D2. In general,
- D1 board contains the CAN controller SW
- D2 board contains the lamp regulation system and is also dedicated to the user interface (digital display on the collimator front panel)

Indications of a defect inside D1 board:
· LED V3 (red, mistake) constantly ON.
· LED V6 (green, CAN 5V supply) does not shine, although CAN power supply of 12 V is recognized in D1, plug X3 exists.
· “Limit reached“ switch error for the height or width plates although no mechanical problems is visible - > light barrier defect (LED V7 or LED V8) on D1.
· No communication with D2
  - D2 error or
  - Serial interface on D1 faulty.

Indications of a defect inside D2 board:
· LED V20 (green, µ controller) constantly ON or OFF - > error in µ controller
· LED V25 (green, 5 V for logic) OFF
· LED V26 (green, +12V for lamp regulation) OFF
· LED V27 (green, -12V for lamp regulation) OFF
· D1 reports no communication with D2
  - Serial interface on D1 faulty or
  - D2 error.

2 SPECIAL TOOLS

Hex wrench, 10 mm
Hex wrench, 11 mm

3 ORDERING INFORMATION

Refer to Chapter 9

PROTEUS XR/a	**2/6**	**PROTEUS XR/A COLLIMATOR**

4 PROCEDURE

Note: Before any action, please make sure that the collimator power is disconnected.

4-1 REPLACE THE D1

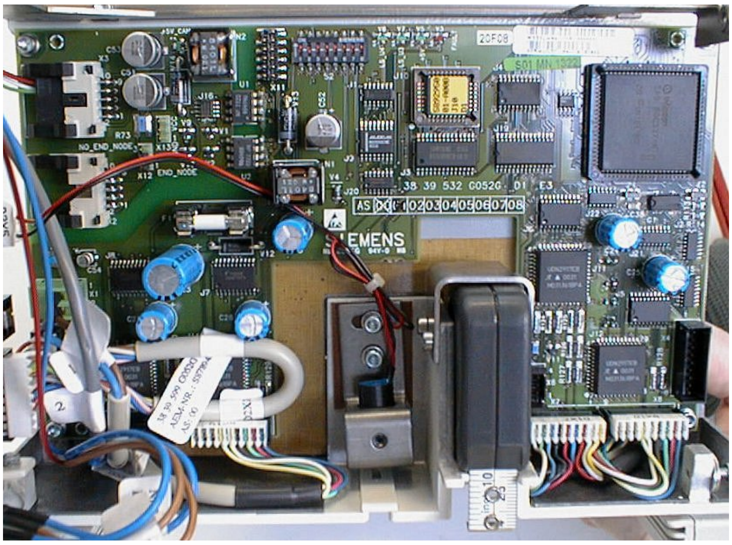
4-1-1. Remove the collimator cover:

The cover is fixed with 9 screws (2 mm allen wrench).
First open the srews on the left and on the right side of the collimator (2 on each side).
Next open the 5 screws on the back side of the collimator and remove the two parts of the cover.

4-1-2. Open the collimator front panel :

The front panel is fixed with 2 screws (2.5 mm allen wrench).
Open the 2 screws on the right side and open the front panel.
The board D1 of the collimator is now visible:

D1-Board:



4-1-3 Replace the defective D1-Board:

a) Pull the following plugs from the D1-Board
    D1X8
    D1X9
    D1X5 (which is the connector to the D2-Board)
    D1X3 (CAN-Bus)
    D1X1.1 and D1X1.2 (Power Supply)

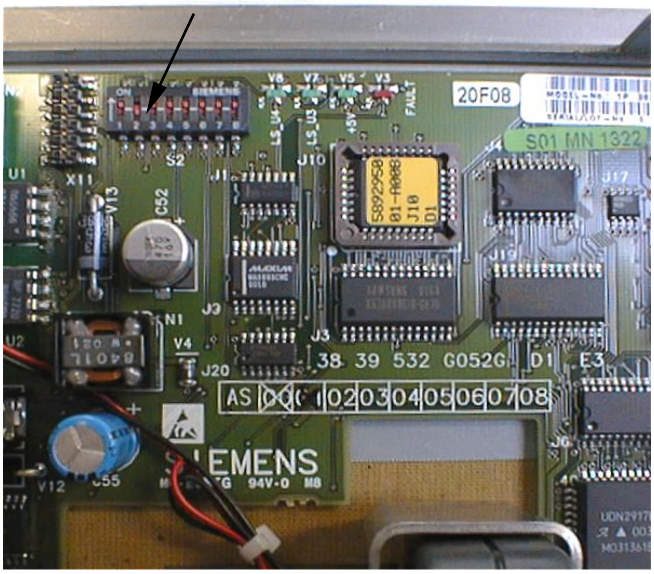
b) Open the 4 screws, which are used to fix the board
    (2.5 mm allen wrench)

c) If necessary replace the EPROM (D1J10)

d) Fix the new D1-Board with 4 screws (2.5 mm allen wrench)

e) Replug the connectors similar to a)

4-1-4 Jumper settings and calibration:



Verify the setting of the DIP switch on the D1-Board. The DIP switch S2 on the D1-board must be set as follows:
S2.1 = ON
S2.2 = OFF
S2.3 = ON
S2.4 = OFF
S2.5 = OFF
S2.6 = ON
S2.7 = ON
S2.8 = ON

Start the collimator calibration mode to get the calibration data stored in the EEPROM.

Note: Without calibration data in the EEPROM of the board D1 the collimator startup may fail.
For collimator calibration carry out the following steps:
a) Verify the DIP switch S2 on D1 (see above). It’s important that switch S2.4 is set to OFF.
b) Close the lamellas in both levels (longitudinal and transversal) manually.
c) Connect the collimator to the power supply.
d) Set dip switch S2.4 to ON
e) The collimator will start a calibration run. The lamellas will fully open to the photoelectric barriers and then close to the minimum opening.
The calibration data will be stored in the EEPROM.
f) Verify the setting of the DIP switch on the D1-Board again. The new settings are
S2.1 = ON
S2.2 = OFF
S2.3 = ON
S2.4 = ON
S2.5 = OFF
S2.6 = ON
S2.7 = ON
S2.8 = ON
g) Now the collimator is full working.
h) Disconnect the power supply before closing the collimator.

4-1-5 Close the collimator front panel:

Close the front panel and fix it with 2 screws (2.5 mm allen wrench).

4-1-6 Add the collimator cover

Add the two parts of the cover to the collimator and fix it with 9 screws
(2 mm allen wrench).

4-2 REPLACING THE D2

4-2-1. Removing the collimator cover:

The cover is fixed with 9 screws (2 mm allen wrench).
First open the screws on the left and on the right side of the collimator (2 on each side).
Then open the 5 screws on the backside of the collimator and remove the two parts of the cover.

4-2-2. Removing the knobs on the front panel

Pull out the marker parts (2/Fig.1) towards the front and remove them.
Using an Allen wrench (3/Fig.1), loosen the 1.5 mm clamping screws on the knobs as shown and remove the knobs (1/Fig.1).
Using an 11 mm hex wrench, remove the securing nuts on the potentiometer shafts and take off the snap rings.

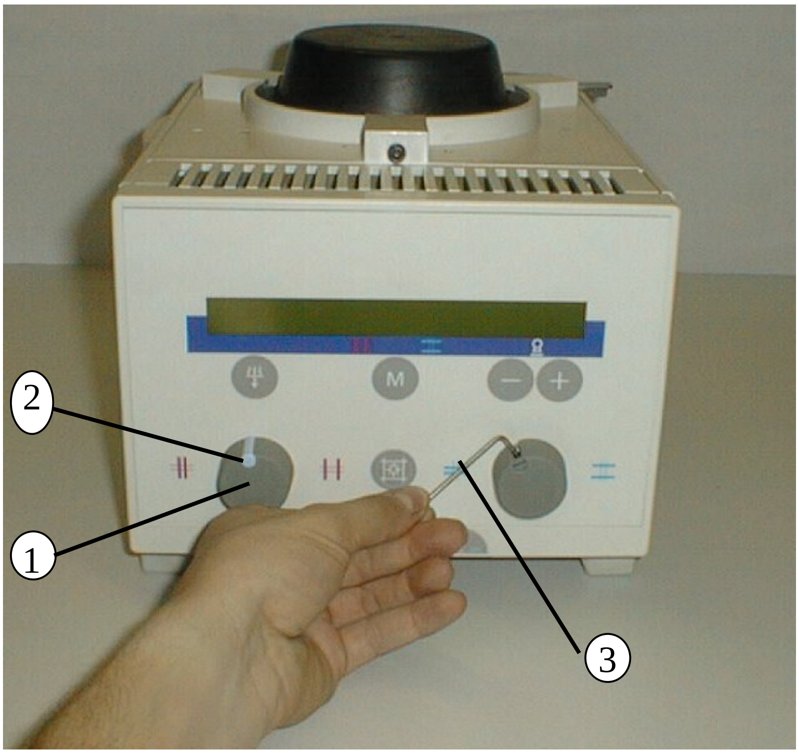


Fig.1

4-2-3. Open the collimator front panel:

The front panel is fixed with 2 screws (2.5 mm allen wrench).
Open the 2 screws on the right side and open the front panel.
The board D2 on the front panel is now visible:

D2-Board:

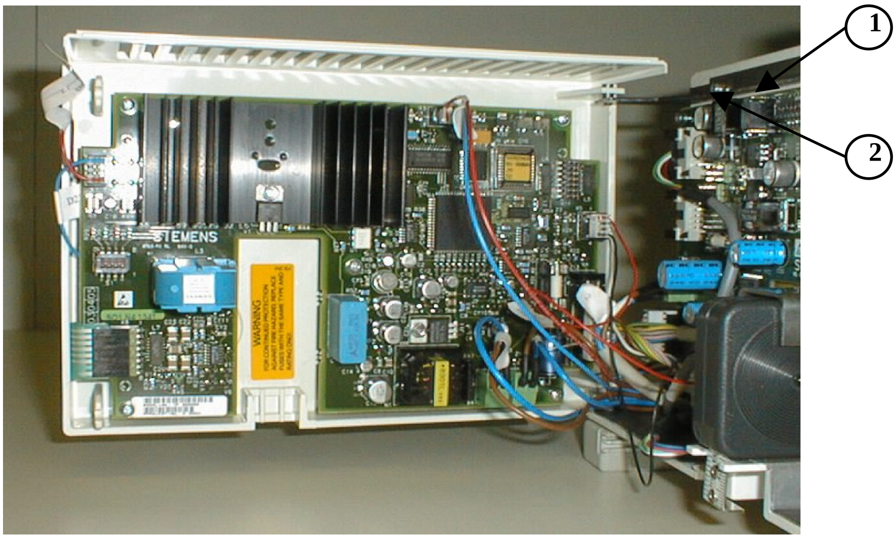


Fig.2

Note: Observe ESD guidelines!

4-2-4. Replace the defective D2-Board:

a) Pull the following plugs from the D2-Board; when doing so, make sure that all connectors are labeled. If labels are lost, label these connectors with appropriate tags.

D2X1	(connector to the D1-Board)
D2X2.1 and	
D2X2.2	(lamp voltage from external power supply)
D2X4.1 and	
D1X4.2	(lamp voltage to bulb)
D2X3	(fan)
D2X5	(laser)
D2X7	(display)
D2X8	(keyboard)

b) Remove the panel mounting (1/Fig.2) by removing the two 2.5 mm Allen screws (2/Fig.2), unhook the front panel and put it down.

c) Remove the 5 cross-head screws, which are used to fix the board.

d) If necessary replace the EPROM (D2J9)

e) Remove the securing nuts and snap rings on the new D2 board.

Install the new D2 board. When doing so, make sure that the X11 pins (1/Fig.3) on the front panel are guided exactly into the female connector on the D2. If the board is exactly installed, all the tips of the pins must be visible from the component side of the D2X11.

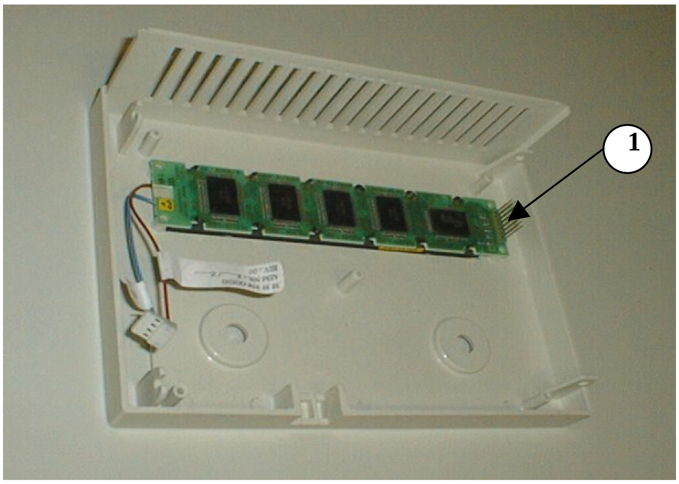


Fig.3

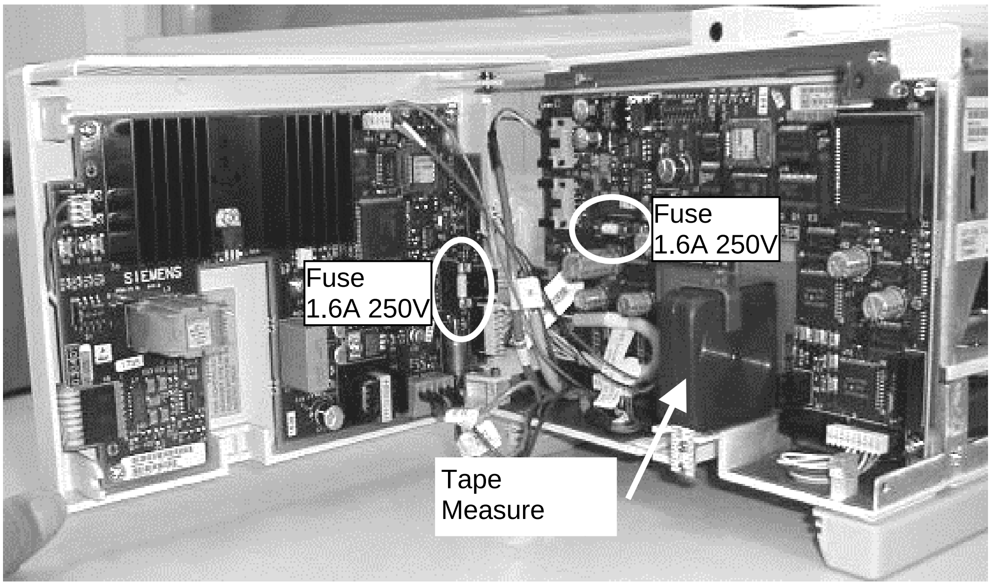
f) Secure the D2 with the 5 mounting screws and replug the connectors similar to a). Install the snap rings and securing nuts (11 mm hex).

g) Place the knobs on the potentiometer shafts and secure them using the 1.5 Allen wrench. When the knobs are turned, they may not scratch against the front panel. Insert the marker parts.

h) Install the front panel and install the panel mounting (1/Fig.2)

4-3 REPLACE THE FUSE OR TAPE MEASURE

- Remove both side cover panels from the collimator.
- Replace the Fuse or Tape Measure



PROTEUS XR/a			**1/7**	**ECLIPSE PROTEUS COLLIMATOR**
subassembly: **Replace the whole collimator, collimator control board, user interface board, collimator lamp assembly, bucky centering light, LCD display, tape**				
purpose:			*version no*. 1 *date:* **15/12/06**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **30 min**	

WARNING

BEFORE REPLACE THE FOLLOWING PARTS, MAKE SURE ECLIPSE PROTEUS COLLIMATOR IS POWERED OFF, OTHERWISE IT MAY RESULT IN INJURY FROM ELECTRIC SHOCK OR OTHER HAZARDS, OR DAMAGE TO THE COLLIMATOR.

1. Replace whole collimator

Note: If the Proteus XR/a collimator is replaced with Eclipse Proteus Collimator unit, remove the lead cup on tube side before new collimator installation.

(1) Replace the Proteus XR/a Collimator AL10F

- Demount the defective collimator from the tube
- Demount the old flange from tube
- Mount the new flange below and the new collimator on tube. Refer to chapter 2, Eclipse Proteus Collimator Installation0

(2) Replace the Eclipse Proteus Collimator

- Demount the defective collimator from the tube
- Mount the new collimator on tube flange. Refer to chapter 2, Eclipse Proteus Collimator Installation

PROTEUS XR/a	2/7	eclipse proteus collimator

2. Replace collimator control board

(1) Removing the defective control board

- Open the collimator front cover by loosening the 2 screws, one is on the top of the collimator, the other is at the bottom.

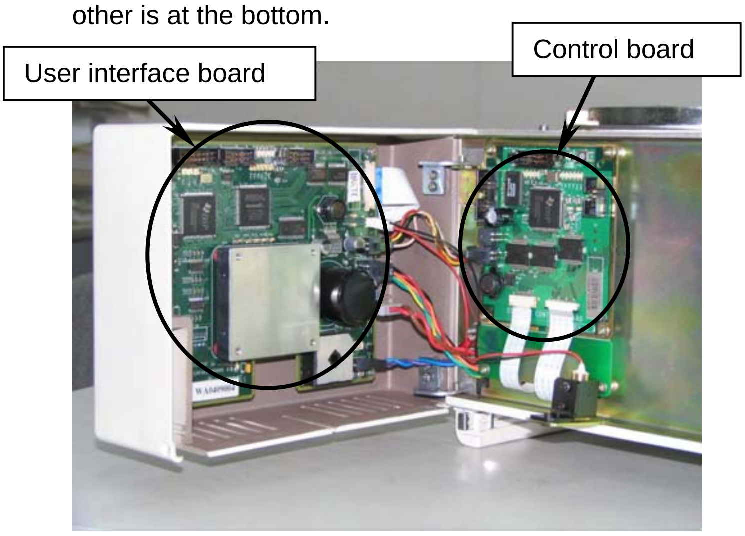


Fig. 1 Collimator Electrical Boards

- Unplug all the plugs of the control board

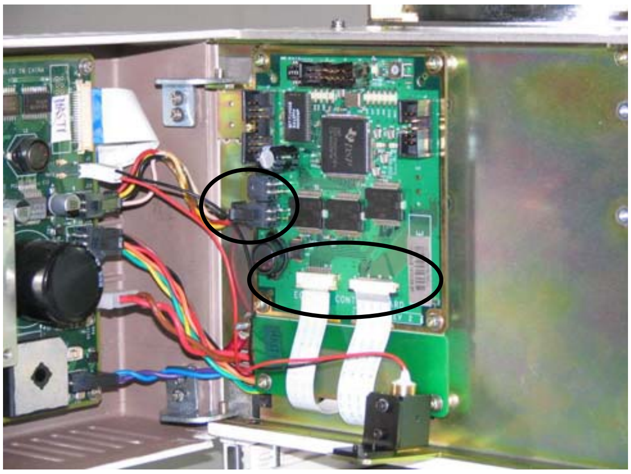


Fig. 2 Collimator Control Board

- Loosen the 4 screws which are used to fix the control board

(2) Mounting the new control board

- Mount the new control board with the 4 screws
- Reconnect all the plugs
- Close the front cover and fix the 2 screws

PROTEUS XR/a	3/7	eclipse proteus collimator

3. Replace collimator user interface board

(1) Removing the defective user interface board

- Open the collimator front cover by loosening the 2 screws, one is on the top of the collimator, the other is at the bottom.
- Unplug all the plugs of the user interface board
- Unhook the front cover and put it down

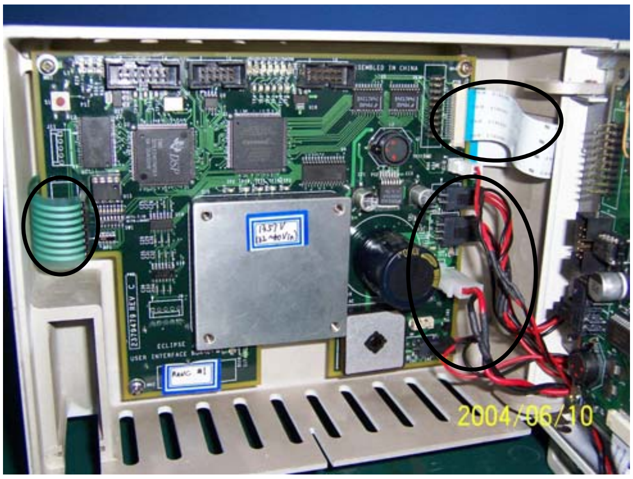


Fig. 3 Collimator User Interface Board

- Remove the knob on front panel
  - ➢ Loosen the screws from the knob hole

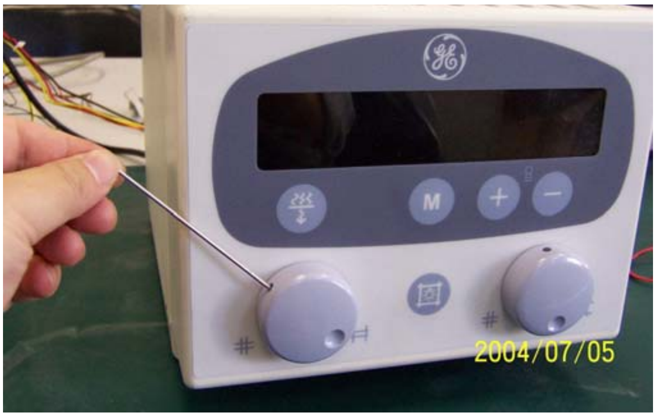


Fig. 4 Collimator Control Knob

  - ➢ Take off the knobs
  - ➢ Using an 11 mm hex wrench, remove the securing nuts on the encoder shafts and take off the snap rings.
- Loosen the 4 screws which are used to fix the user interface board

(2) Mounting the new user interface board

- Remove the securing nuts and snap rings from the encoders shaft on the new user interface board.
- Mount the new user interface board with the 4 screws
- Mount the securing nuts and snap rings on the new user interface board

- Place the knobs on the encoder shafts and secure them using the 1.5 Allen wrench. When the knobs are turned, they must not scratch against the front panel.
- Install the front cover on collimator
- Reconnect all the plugs
- Close the front cover and fix the 2 screws

4. Replace collimator lamp assembly

WARNING

ONLY THE LAMP OFFERED BY GEHL WITH THE HOLDER CAN BE USED AS REPLACED PART. OTHERWISE IT MAY CAUSE ISSUE OF LIGHT ILLUMINANCE, EDGE CONTRAST OR LIGHT/X-RAY FIELD ALIGNMENT.

(1) Removing the defective lamp assembly

- Move the collimator right cover (1/Fig.5) and the shielding for lamp mounting hole (2/Fig.5).

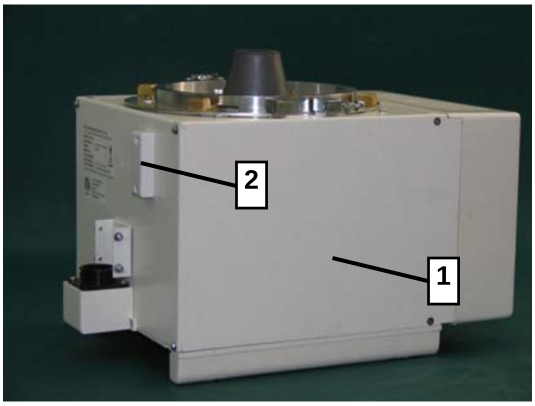


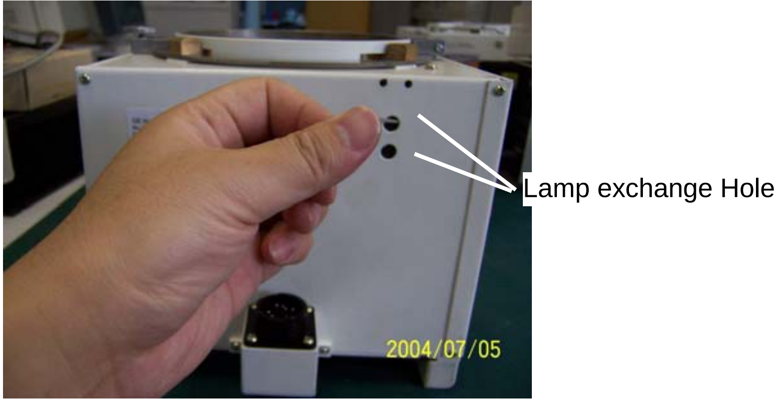
Fig. 5 Collimator Lamp Exchange Cover

- Unplug the connector of the lamp

WARNING

IF THE LAMP OF THE LIGHT LOCALIZER REMAINS ILLUMINATED FOR A LONGER PERIOD OF TIME, THE HOLDER MAY HEAT UP. PLEASE AVOID TOUCHING THE LAMP HOUSING UNTIL IT COOLS DOWN.

- Loosen 2 mounting screws of the lamp assembly from the hole on read side of the collimator and remove the defective lamp assembly from the right side of the collimator.



- Loosen 4 screws of lamp support, take out the failed lamp. See Figure 6.

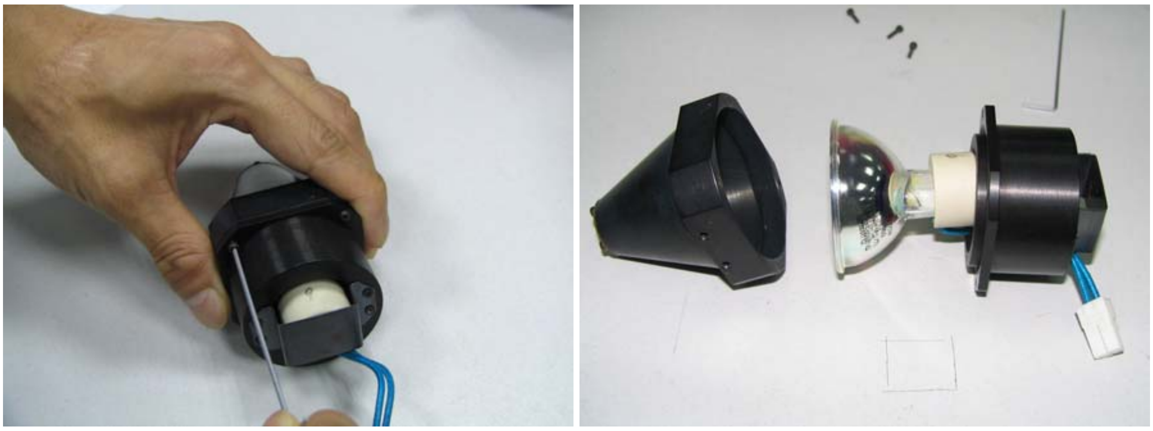
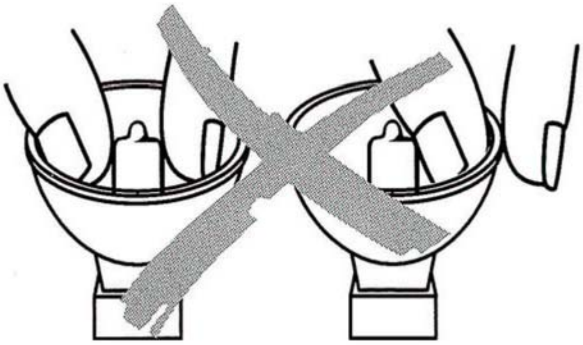


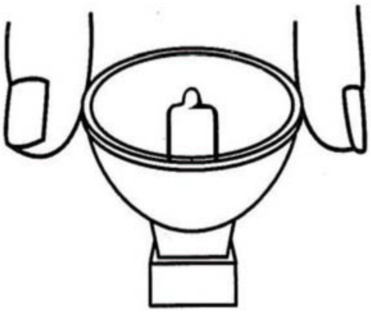
Fig. 6 Lamp Exchage

(2) Mounting the new lamp assembly

- Mount the new lamp into lamp support
- Mount the new lamp assembly on collimator
- Reconnect the connector of the lamp
- Mount the right cover of the collimator and the shielding for lamp mounting hole

CAUTION To avoid damage the lamp, do not touch the bulb or inside of the reflector with bare hands.





5. Replace collimator bucky centering light

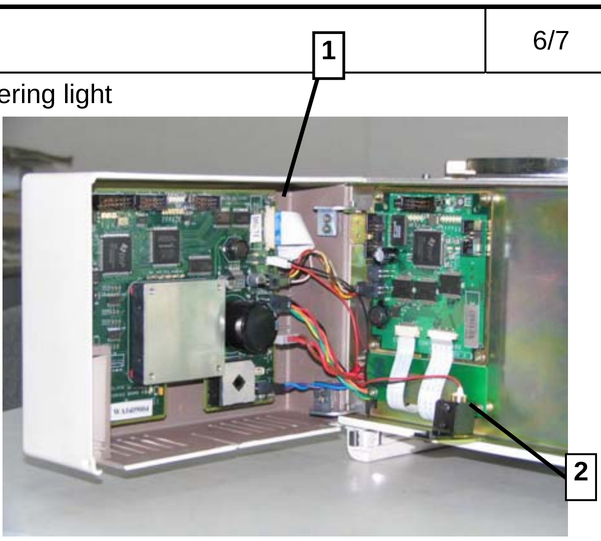


Fig. 6 Collimator Bucky Centering Light Mounting

(1) Removing the defective bucky centering laser equipment
- Open the collimator front cover
- Unplug the connector (1/Fig. 6) of bucky centering laser equipment
- Loosening the mounting screws, Remove the laser equipment (2/Fig. 6) from the laser support

(2) Mounting the new bucky centering laser equipment
- Insert the laser equipment into the support, fix the screw
- Reconnect the connector to user interface board

(3) Align the laser beam with light field
- Power on the collimator
- Set SID=1m, FOV=200mmX200mm
- Verify if laser line is at the transverse center of the light field
- Adjust the 2 mounting screws until the laser beam deviation to the center of the light field < 2mm
- Close the front cover and fix it with the 2 screws

6. Replace collimator LCD display

(1) Removing the defective LCD display
- Open the collimator front cover.
- Remove the user interface board, referring to step (1) of Replace collimator user interface board above. The LCD display is now visible.
- Loosen the 4 screws which are used to fix the LCD module.

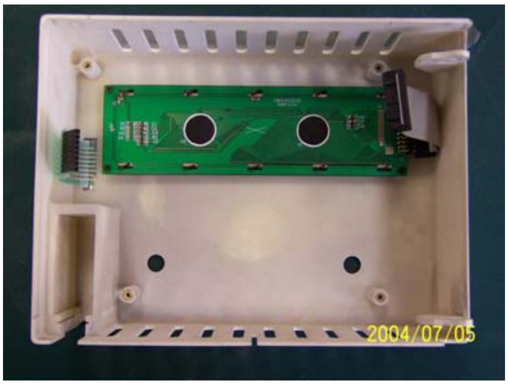


Fig. 7 Collimator LCD Module

PROTEUS XR/a	7/7	eclipse proteus collimator

(2) Mounting the new LCD display

- Mount the new LCD module with the 4 screws
- Mount the user interface board, referring to step (2) of Replace collimator user interface board above.
- Reconnect all the plugs
- Close the front cover and fix the 2 screws

7. Relace collimator tape

- Open the collimator front cover
- Remove the defective tape from the tape holder
- Put the new tape in the holder
- Close the front cover with the 2 screws

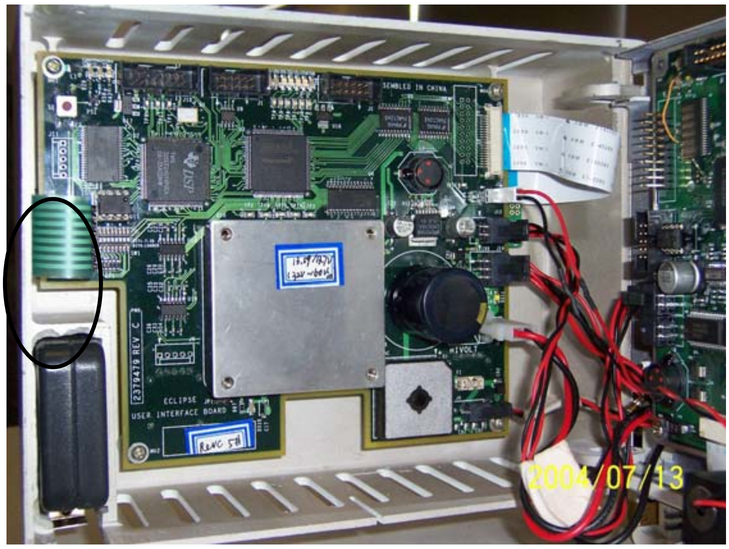


Fig. 8 Collimator Tape

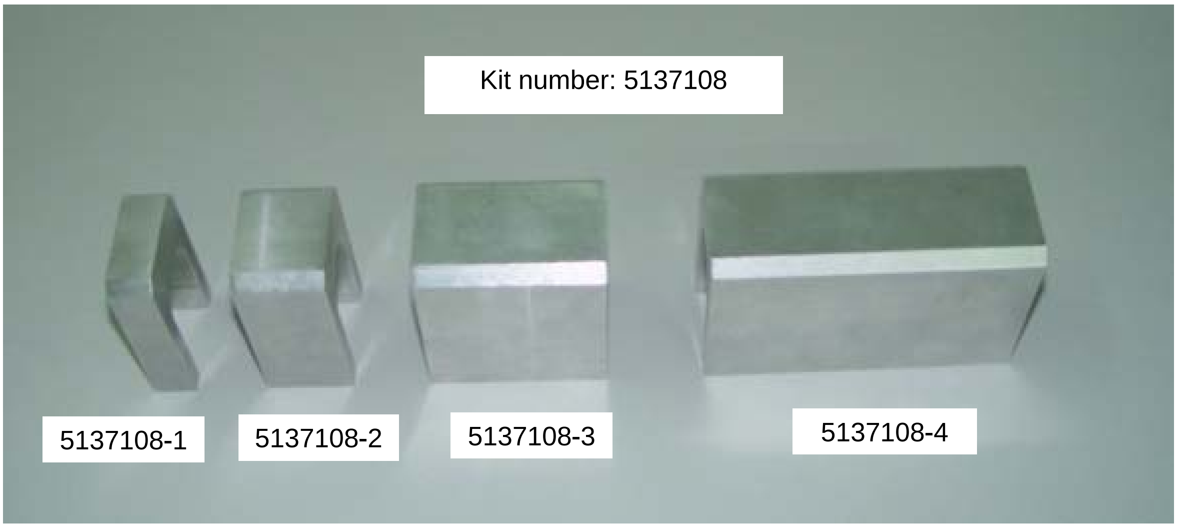
PROTEUS XR/a			**1/10**
subassembly: **Table Logical Board or Table Motor Replacement**			
purpose:			*version no*. 3 *date:* **10/10/06**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **30 min**

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCKOUT/TAGOUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

CAUTION **To protect the circuit boards, be sure to wear the antistatic bracelet.**
Before removing the motor from under the table, or untie the motor chain, to avoid the injury by the potential dropping table, put the blocks kit (5137108) over the rod.

To replace the motor or logical board, perform the following steps:

1. Raise the table to highest position.
2. Power off the system and apply LOTO to the main circuit breaker. Wait 3 minutes for discharge of the DC Bus.
3. Remove the table covers.
4. Apply the mechanical LOTO blocks kit (5137108) to the table to avoid table movement.



Item	Block Kit	Length
	5137108	210mm
1	5137108-1	15mm
2	5137108-2	30mm
3	5137108-3	60mm
4	5137108-4	105mm

PROTEUS XR/a	**2/10**	

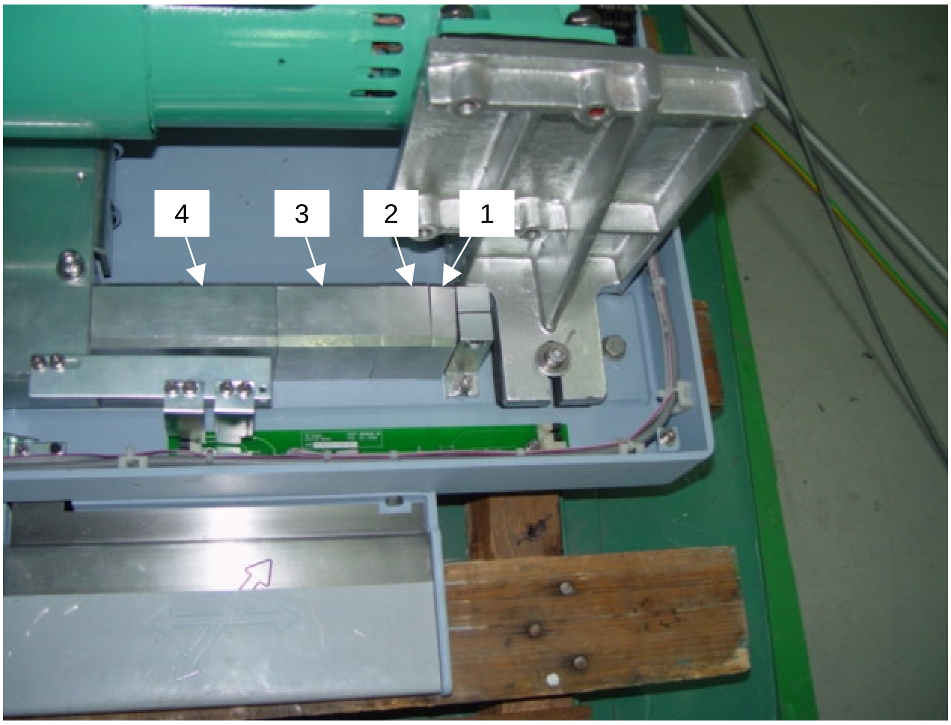
Please get different length by using different blocks according to the table's height by the below table.

Note: ***Table must not be driven up and down when the blocks are put over the rod.***

Item	Length (Max. to Min.)	Related Parts
4+3+2+1	210mm	5137108
4+3+2	195mm	5137108-4/3/2
4+3+1	180mm	5137108-4/3/1
4+3	165mm	5137108-4/3
4+2+1	150mm	5137108-4/2/1
4+2	135mm	5137108-4/2
4+1	120mm	5137108-4/1
4	105mm	5137108-4
3+2+1	105mm	5137108-3/2/1
3+2	90mm	5137108-3/2
3+1	75mm	5137108-3/1
3	60mm	5137108-3
2+1	45mm	5137108-2/1
2	30mm	5137108-2
1	15mm	5137108-1

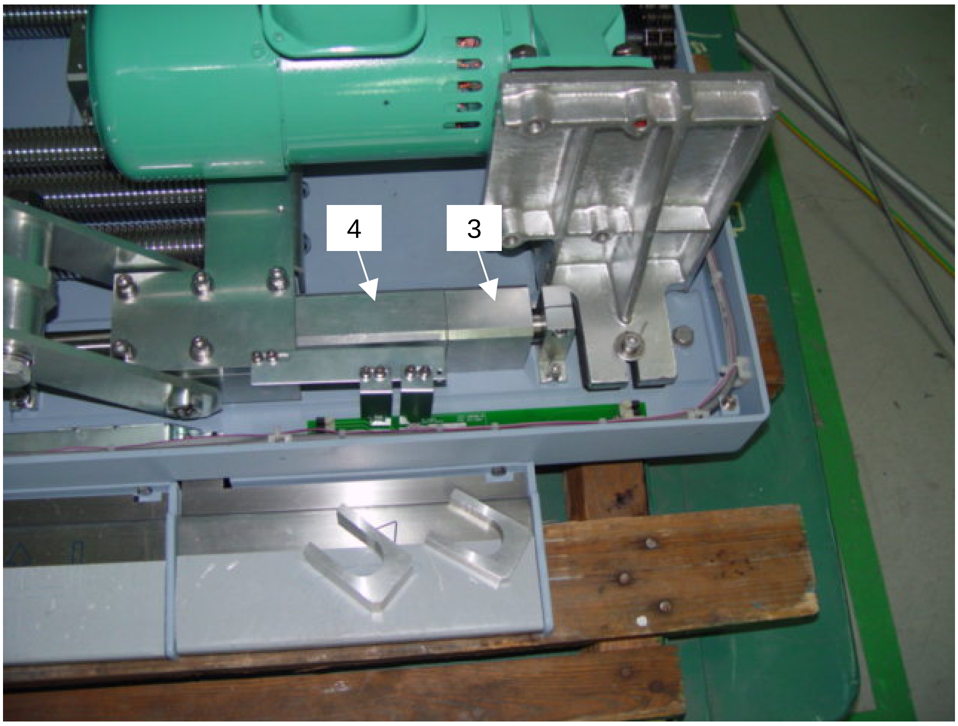
Please refer to following examples.

Example 1: All the blocks are over the rod.

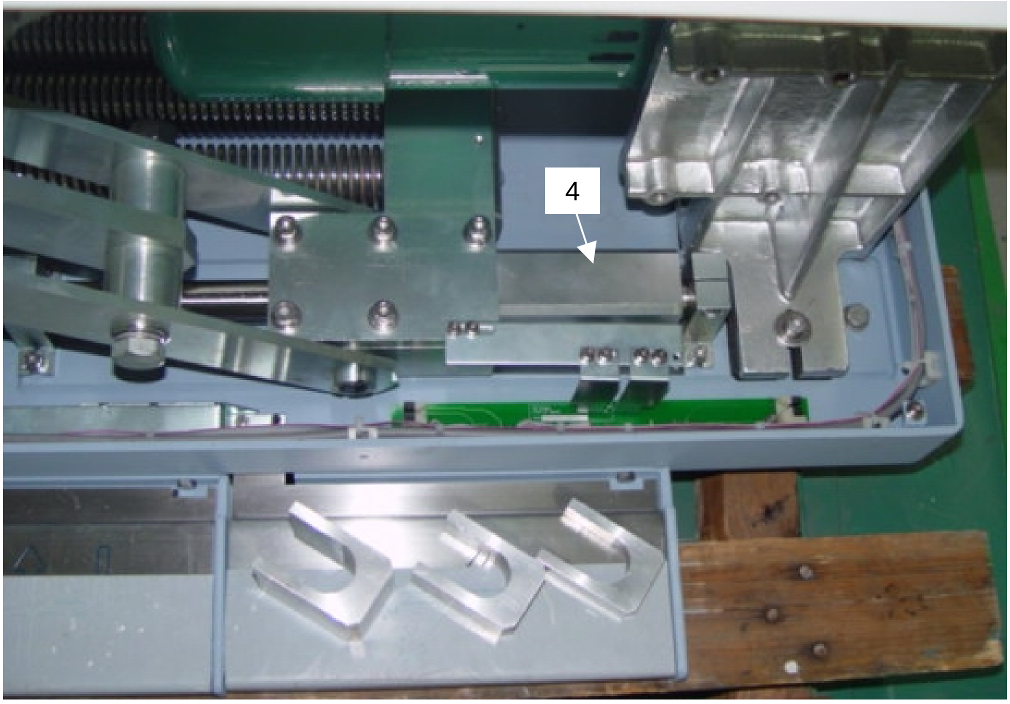


PROTEUS XR/a	3/10	

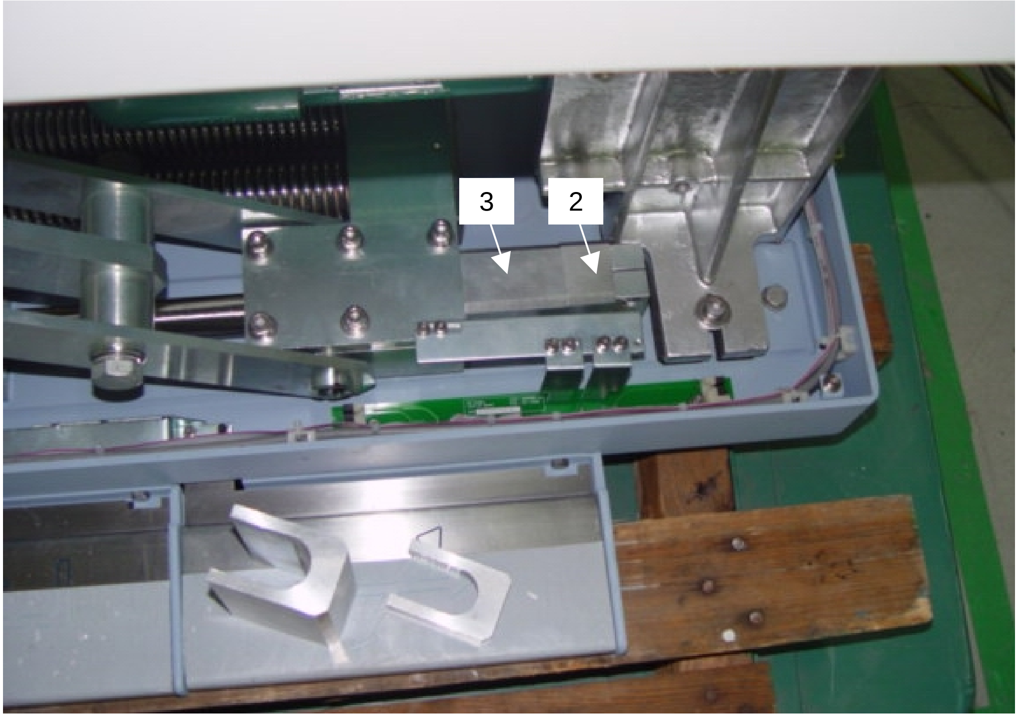
Example 2: The blocks 5137108-3 and 5137108-4 are over the rod.



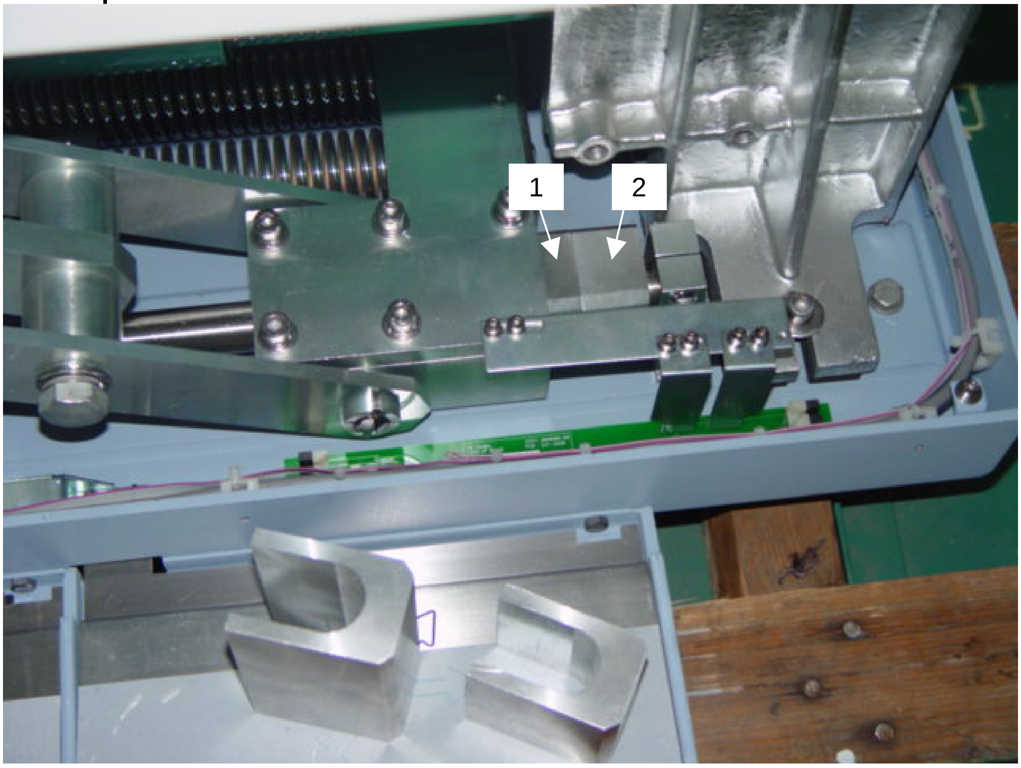
Example 3: The block 5137108-4 is over the rod.



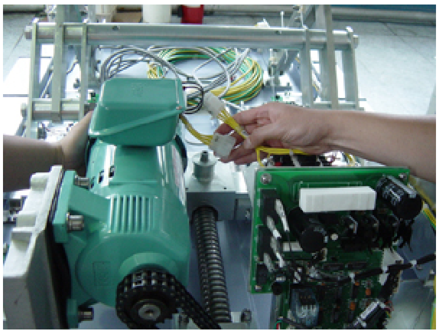
Example 4: The blocks 5137108-2 and 5137108-3 are over the rod.



Example 5: The blocks 5137108-1 and 5137108-2 are over the rod.

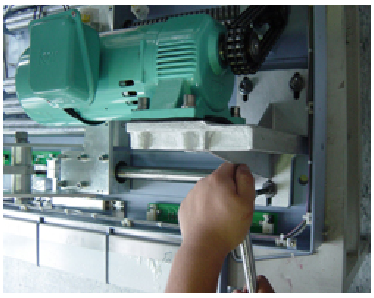


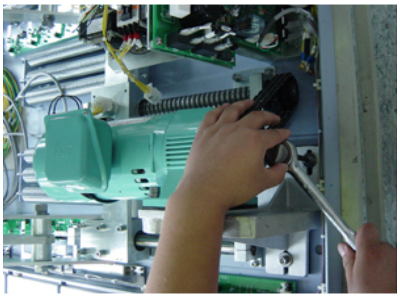
5. Disassemble the old motor from the table.
    1) Unplug the cable.

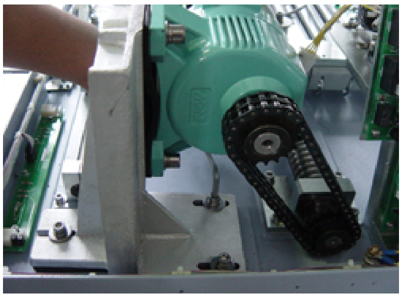


CAUTION **The motor is very heavy. Please be careful when removing.**

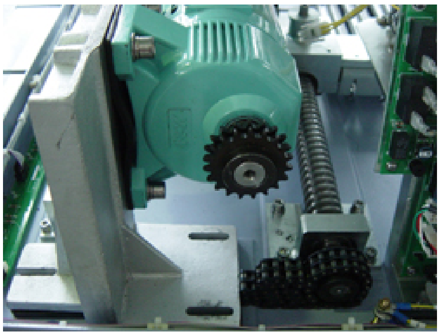
    2) Demount the three screws on the motor chassis with wrench.



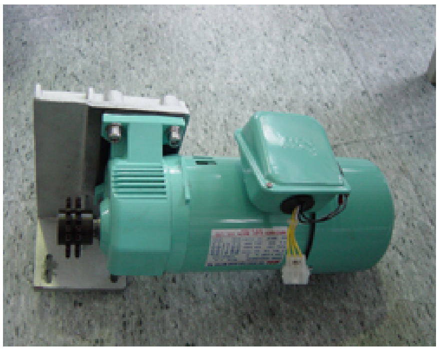




    3) Take apart the chain from the gear.



    4) Remove the old motor together with the motor chassis from the table.



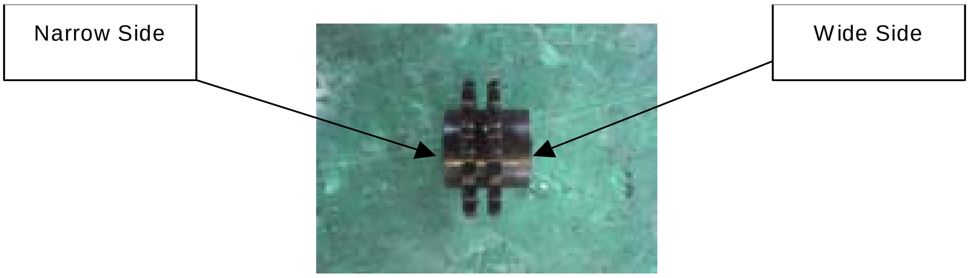
5) Demount the screws which fixing the motor and motor chassis.

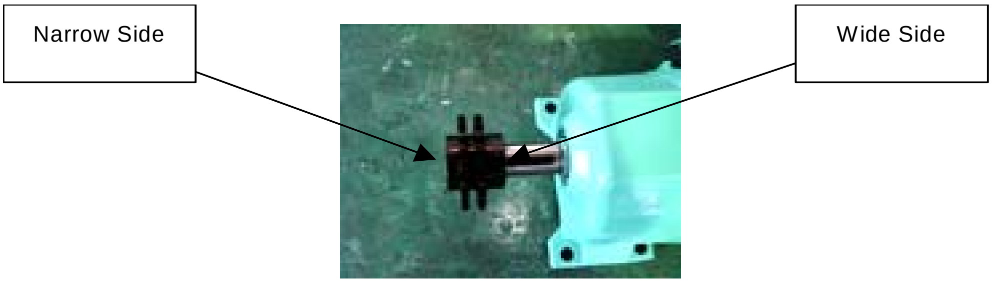
6. Assemble the new motor to the table.

Note: The new motor should be sent together with a gear. If it is, please go to step 2) to assemble the motor chassis. Otherwise, please proceed to step 1).

1) Mount the gear onto the motor shaft with rubber or wood hammer. The gear should be hammered very close to the motor. There may be a little adjustment while fixing the chain with the gear.

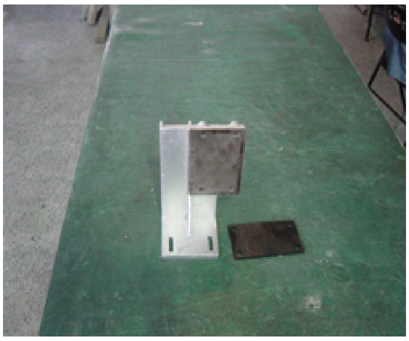
Note: The width of the two sides of the gear is not equal.
The narrow side of the gear should be placed outside.

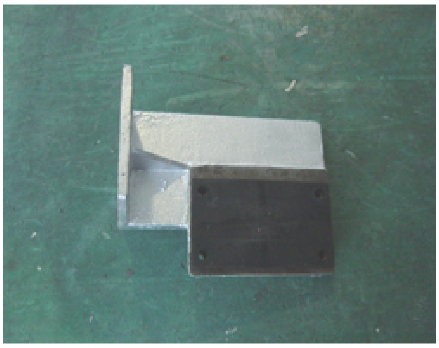




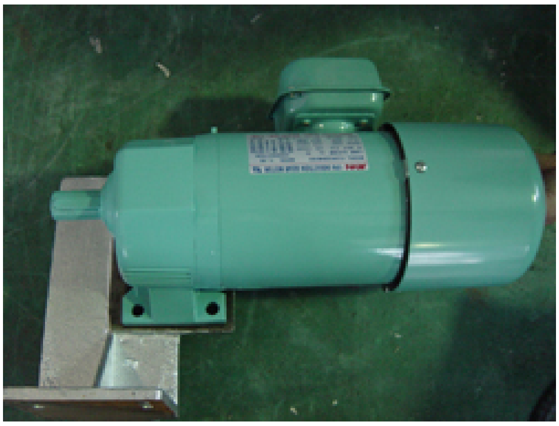
2) Assemble the motor onto the motor chassis.

a) Place the rubber piece on the motor chassis.





b) Fix the motor onto the motor chassis with the rubber piece between the motor and the motor chassis.

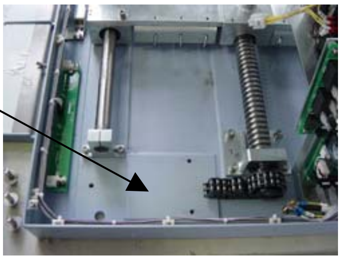


c) Mount the screws.

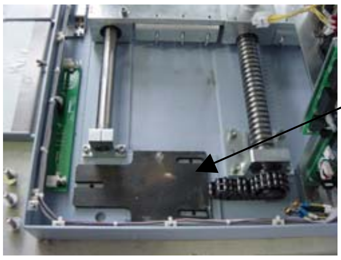
d) Use flat and spring washer when necessary.

3) Assemble the motor onto the table.

a) Place the rubber piece on the interface between the motor chassis and the table.

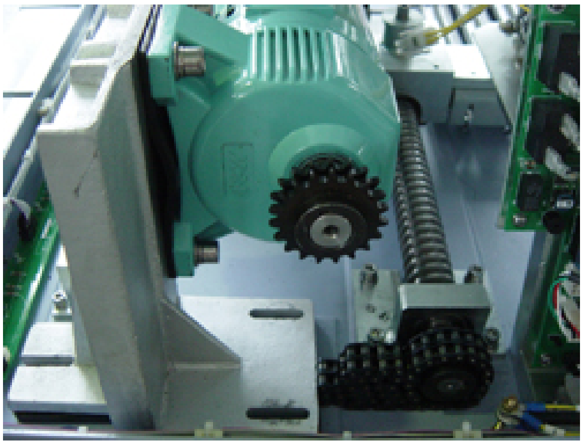


Place the rubber piece here.

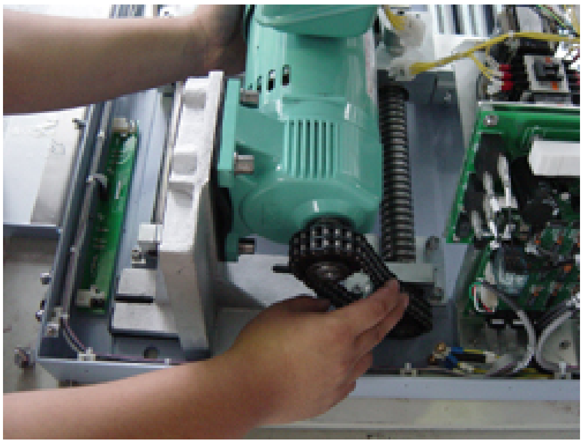


Place the rubber piece here.

b) Place the motor chassis onto the rubber piece.



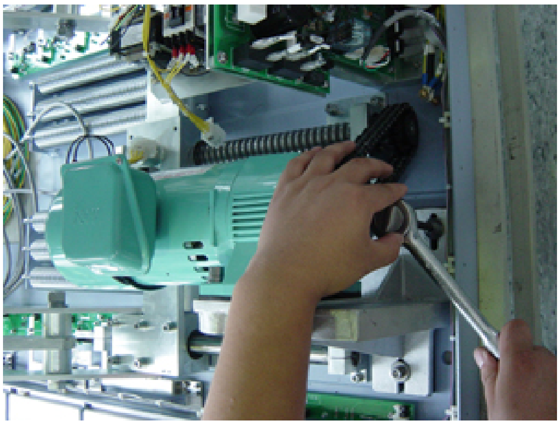
c) Fix the chain with the gear.



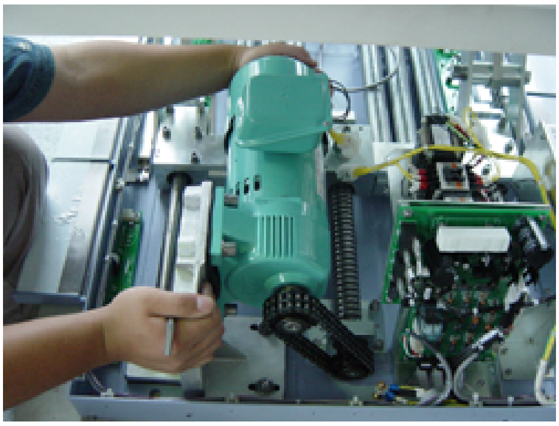
PROTEUS XR/a	**9/10**	

d) Partly mount the screws which fixing the motor chassis and the table.

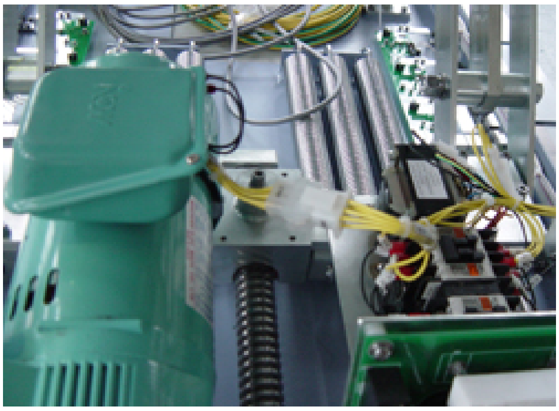
Note: Don't mount the screws fully. And make the motor could be shaken slightly on the table.



e) Modify the angle and position of the motor to fasten the chain by shaking.

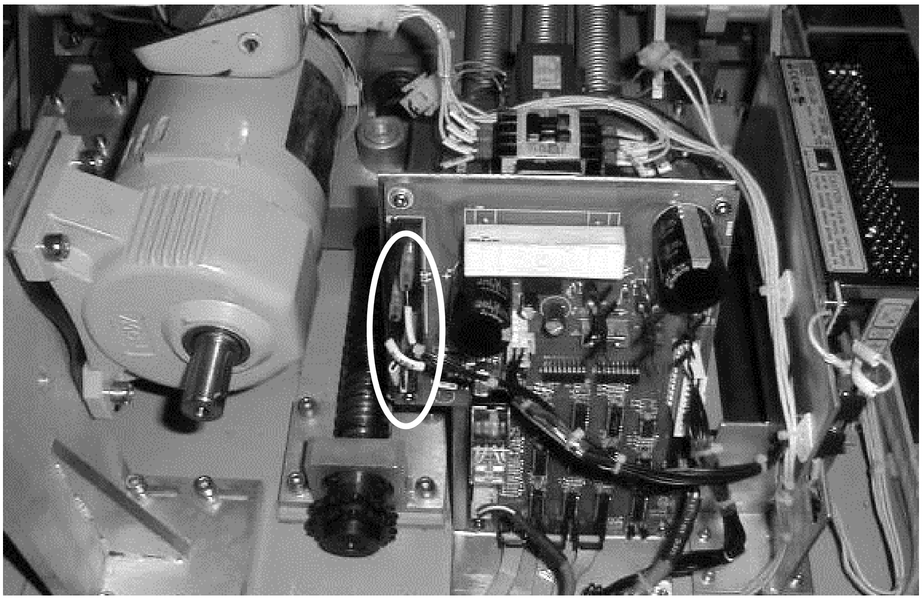


f) Mount the screws fully.
g) Plug the cable.



PROTEUS XR/a	10/10	

7. Remove the mechanical LOTO and re-apply power to the system.
8. Check the direction of table motion when presses down the foot pedal. If the table motion is opposite with the foot pedal, exchange the two jumpers CS3-4 and CS4-4 on logical board.

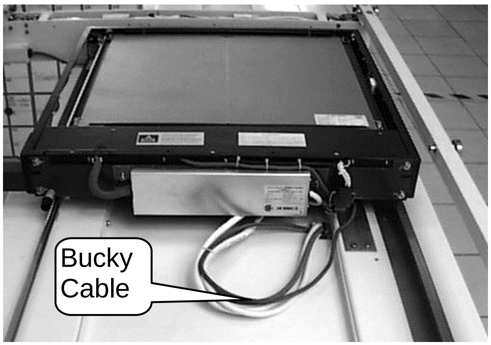


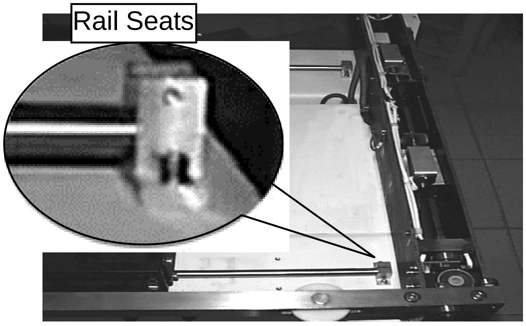
PROTEUS XR/a		**1/1**	**IST 023**
subassembly: **Bucky Installation**			
purpose: Installation Procedure		*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to* / /	*from* *to*	*Time:* ***0h*** **40 min**

The following procedures describe how to install the Bucky/Grid option.

To install bucky, proceed as follows:

1. Remove the table top by unscrewing four screws under the table top.





2. Remove the four bucky rail seats. Replace the old cassette cabinet with new bucky.
3. Reassemble the rail seats.
4. Connect bucky cable and cassette sensing tray cable to the connectors.
5. Route the bucky cable with Ion-chamber cable through the hole in the middle of the table. Use ty-rap to fasten the cables with adhesive disc and make sure the bucky move freely without any cable scratching. Then tie the cables along with table EM lock cable.

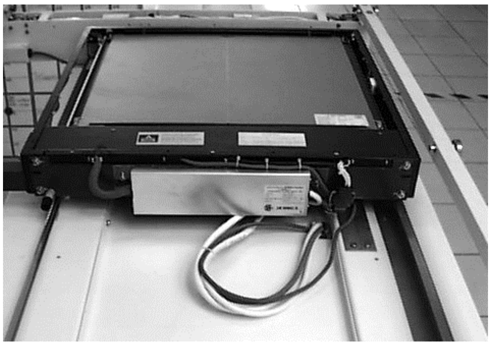
PROTEUS XR/a			**1/2**	**IST 024**
subassembly: **Ion Chamber Installation**				
purpose: Installation Procedure			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **40 min**	

The following procedures describe how to install the Ion Chamber/Grid option.

Ion Chamber Insertion

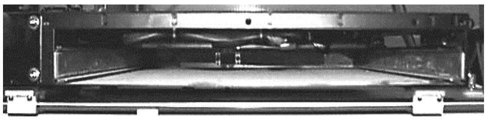
To insert the Ion Chamber, proceed as follows:

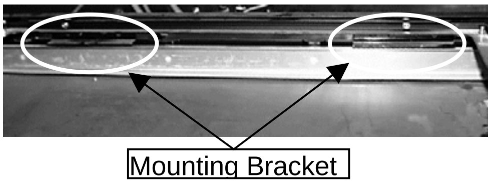
1. Unpack the table top by unscrewing four screws under the table top.



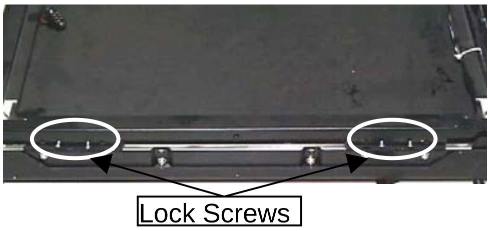
2. Insert the Ion chamber into bucky and locate the Ion chamber on the mounting bracket.

Note: Make sure the Ion chamber detectors 1,3 are towards table head end.

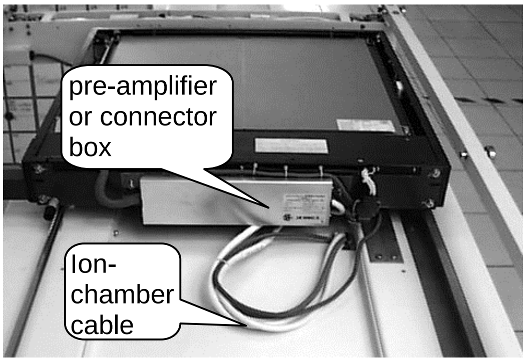




3. Fasten the four lock screws



PROTEUS XR/a	2/2	IST 024


pre-amplifier or connector box
Ion-chamber cable

4. Mount the Ion chamber pre-amplifier or connector box with provided screws.

5. Route the Ion-chamber cable with bucky cable through the hole in the middle of the table. Use ty-rap to fasten the cables with adhesive disc and make sure the bucky move freely without any cable scratching.

PROTEUS XR/a			**1/7**	**IST 025**
subassembly: **Tomo-Link Installation**				
purpose: Installation Procedure			*version no*. 1 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **2 hours**	

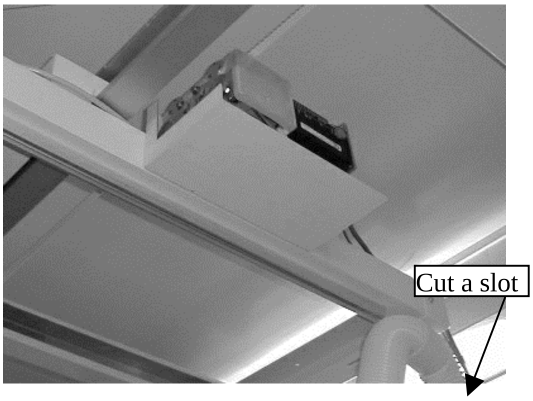
The following procedures in addition to the Tomo-link Service Manual (Direction: 2133821-100) describe how to install the Tomo-Link option.

Note: ***The Tomo-Link assembly should be installed with the Proteus table and XT suspension only. The system software should be Rev1.84, or above.***

1 Drive unit installation (Inboard bridge), refer to Tomo-Link Service Manual (Direction: 2133821-100).

Note: ***The driver unit can only be installed on right side of bridge.***

2 Cut a slot on the top of cable hose. Then insert two driver cables (2124056 and 2132261) into hose.
Plug in these two cables and route in hose properly.



3 Tomo-link Yoke selection.

Note: ***There are two different Tomo-link Yokes optional for RAD 14,21 X-ray tube and MX100 X-ray tube seperately both shipped to the sites. Pick up the matching Tomo-link Yoke according to the X-ray tube type. (Refer to the form below)***

Note: ***For RAD 14/21 X-ray tube, DO NOT dispose the Tomo-link Yoke 2109740-8 before finished STEP 4 in this Job Card.***

X-ray tube	**Tomo-link Yoke matched**	**Part Number**
RAD 14/21 X-ray tube	Extended Tomo-link Yoke	2352540
MX100 X-ray tube	Tomo-link Yoke	2109740-8

4 For system with RAD 14 or RAD 21 X-ray tube, transfer the accessories (rubber spacer, top shim and all screws) factory-mounted on the Tomo-link Yoke 2109740-8 to the Extended Tomo-link Yoke 2352540.

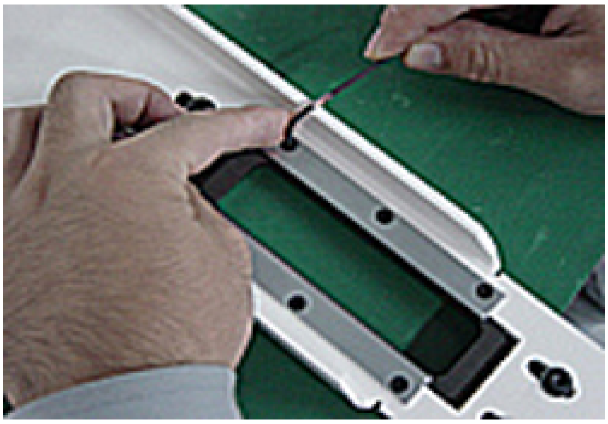
Note: ***For systems with MX100 tube, skip this step.***

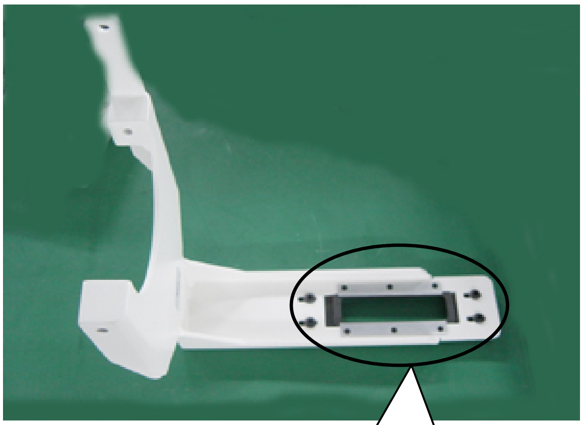
Note: ***The Proteus XR/a systems with Tomo are shipped with both the Tomo- link Yoke 2109740-8 and the extended Tomo-link Yoke 2352540. But only the Tomo- link Yoke 2109740-8 is shipped with the accessories (rubber spacer, top shim and all screws) mounted.***

For systems equipped with RAD 14/ RAD 21 tube, apply the extended Tomo-link Yoke 2352540. Remove the accessories from the Tomo-link Yoke 2109740-8 and mount the accessories to the extended Tomo-link Yoke 2352540 before installing the Tomo-link Yoke. (See steps following)

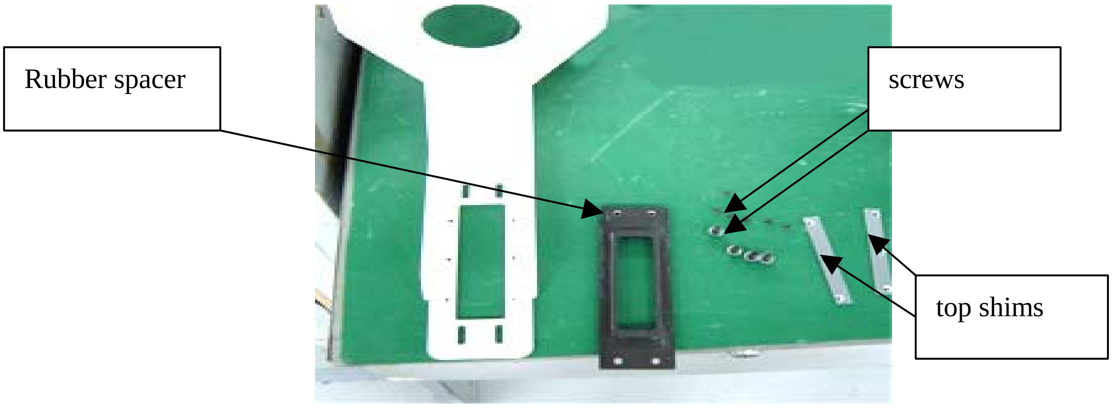
PROTEUS XR/a	**2/7**	**IST 025**

a) Demount the screws and remove the rubber spacer from the Tomo-link Yoke 2109740-8.



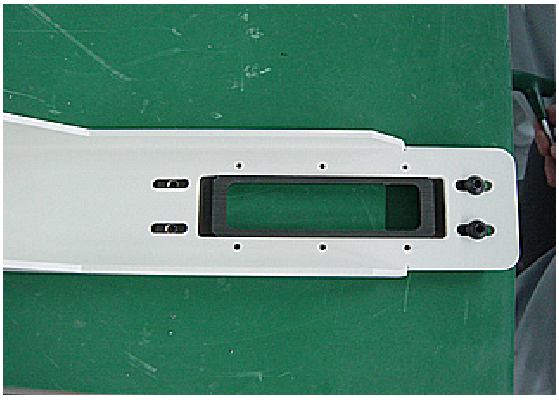


Transfer the accessories (rubber spacer, top shim and all screws) to the Extended Tomo-link Yoke 2352540

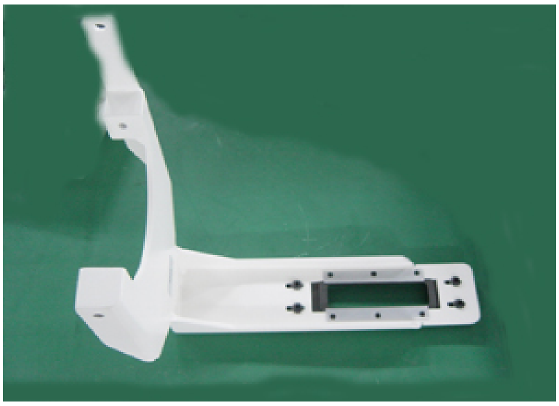


b) Fit the rubber spacer to the Extended Tomo-link Yoke and mount the screws without fully fasten .

NOTE: Pay attention to leave loose the screws for Fulcrum arm alignment.



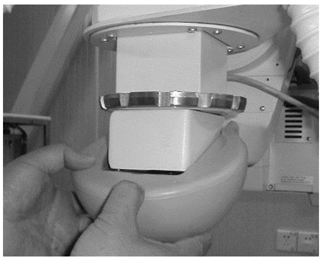
c) Fix the top shim.



d) After aligned with the Fulcrum Arm (installed in step 14 of this Job Card), fasten fully the screws holding the rubber spacer.

5 Tomo-link Yoke installation, refer to Tomo-Link Service Manual (Direction: 2133821-100). (Selected in step 3: for RAD 14, 21 X-ray tube, use Extended Tomo-link Yoke GPCP No.2352540, for MX 100 X-ray tube, use Tomo-link Yoke GPCP No.2109740-8)

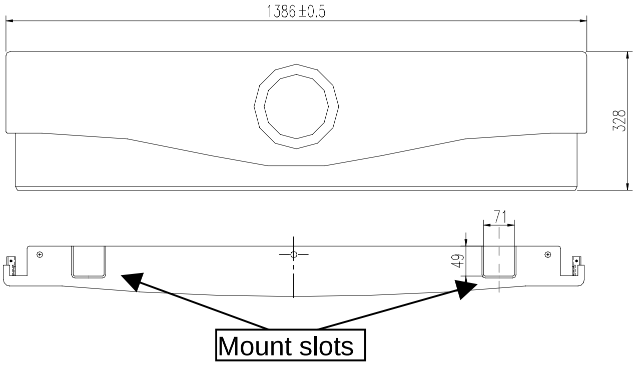
Note: Remove end rubber before install Yoke.



6 Take off the table back covers and the lower right side cover.

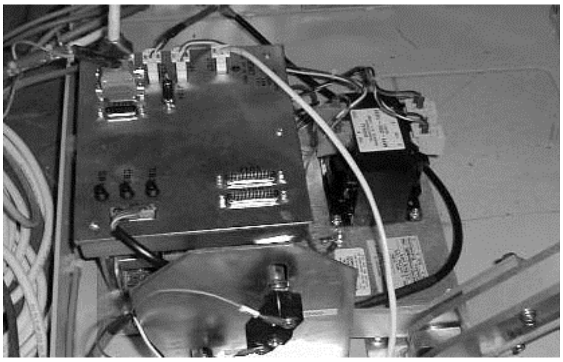
Note: For Tomo-link upgrade only.

Cut out two mounting slots on upper back cover.



7 Mount Tomo control box into table base using four M4x8 screws, washers and lock washers.

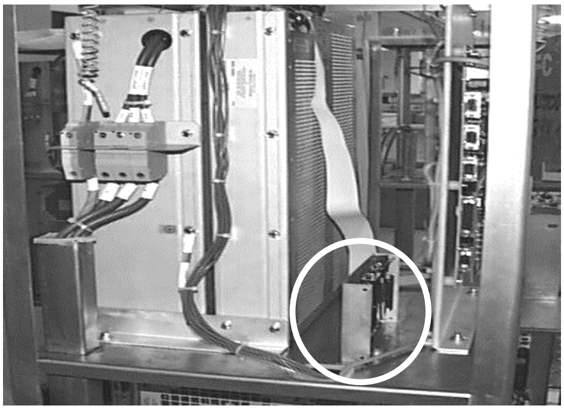
Note: For Tomo-link upgrade only.



8 Mount Tomo I/F board into cabinet using two socket-head M4x10 screws, washers and lock washers.

Note: For Tomo-link upgrade only.

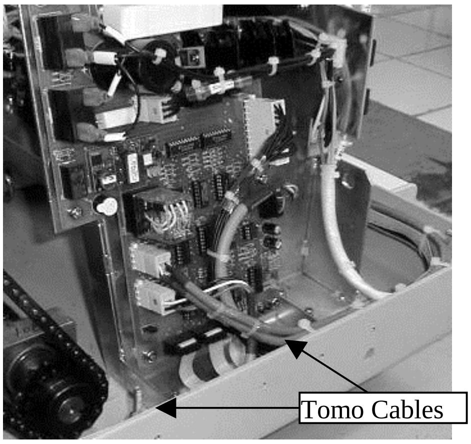
Note: Find the Tomo I/F board in box # 6-8, crate #6.

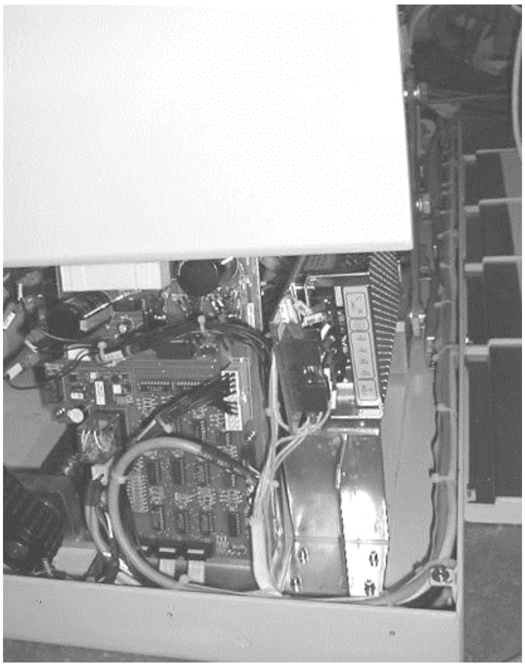


9 Connect Tomo cables inside table base according to "TOMO-LINK SYSTEM INTERCONNECTION ILLUSTRATION" in page 10-21 and 10-22.

Route and ty-rap cable properly.

Note: For Tomo-link upgrade only.

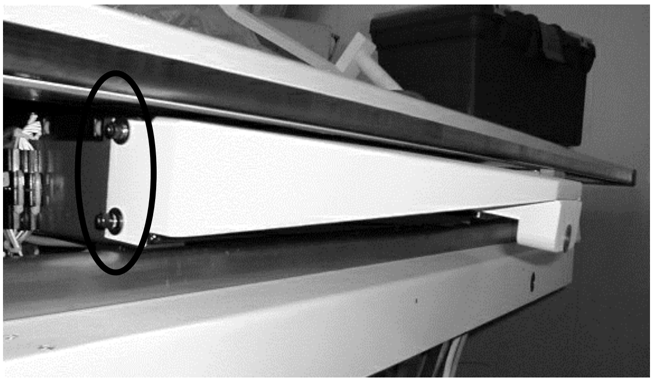




PROTEUS XR/a	5/7	IST 025

10 Install bucky connector.

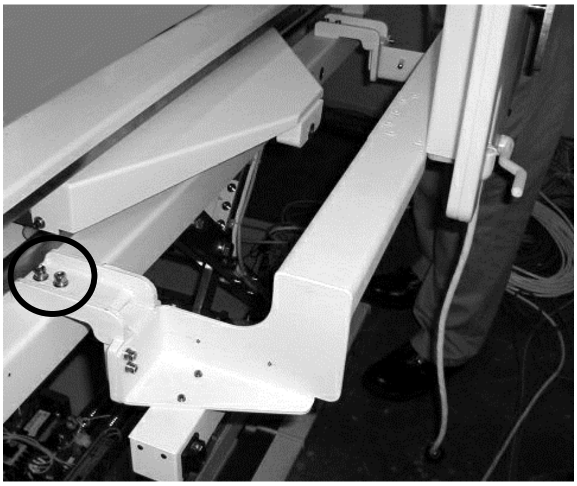
Note:* *For Tomo-link upgrade only.



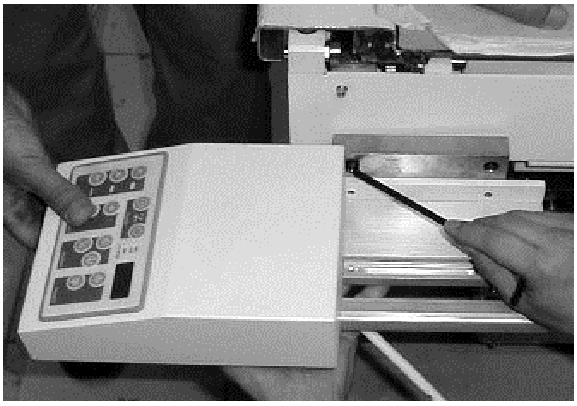
11 Install table rear cover.

12 Mount Fulcrum Tower bracket onto table using four socket-head M8x25 screws, washers and lock washers.

13 Fulcrum Tower installation, refer to Tomo-Link Service Manual (Direction: 2133821-100).

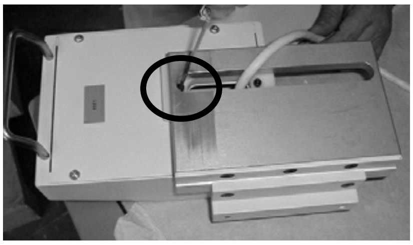


14 Fulcrum Arm installation, refer to Tomo-Link Service Manual (Direction: 2133821-100).



15 Control box installation.
Mount control box on the foot end of table using socket-head M6x16 screws and lock washers.

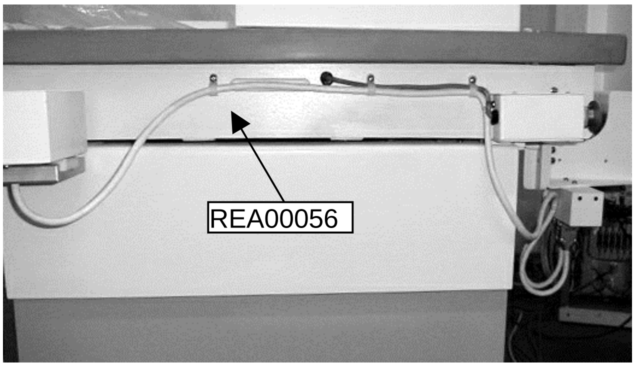
Note:* *There are two stop screws under control box. Remove one of them to mount control box.



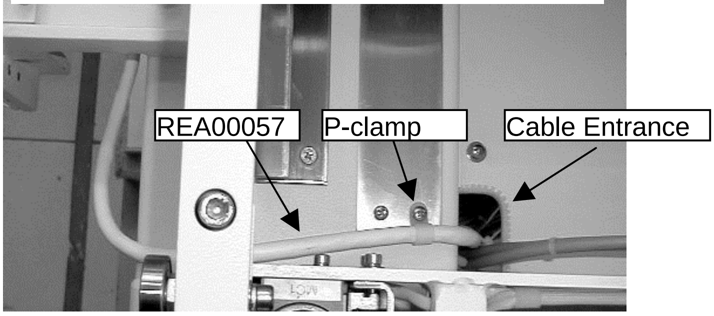
PROTEUS XR/a	**6/7**	**IST 025**

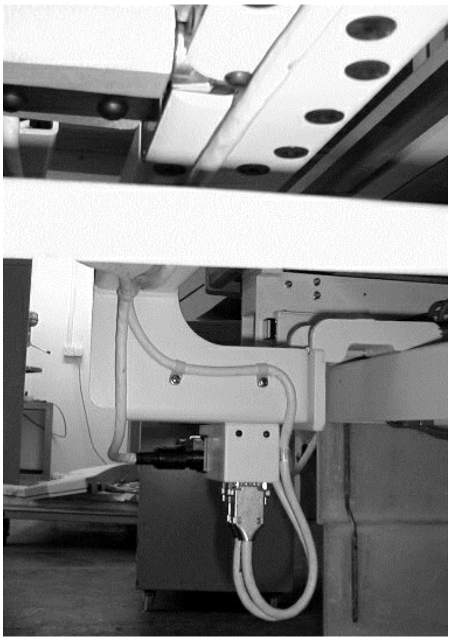
16 Connect Tomo cables according to "TOMO-LINK SYSTEM INTERCONNECTION ILLUSTRATION" on pages 10-21 and 22.
Route and ty-rap cable properly.

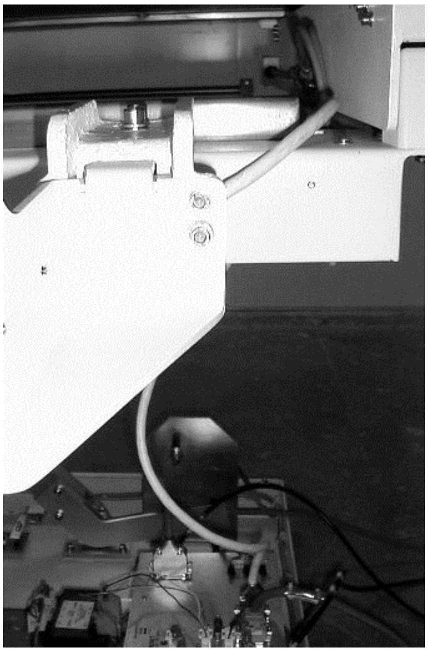
Route the cable (REA00056) according to the following illustration:



Remove the head end table top bumper. Pull out the tabletop until you can see the cable entrance. Route the cable (REA00057) according to the following illustration. Use P-clamp and ty-wrap to fasten it.
Make sure the cable will not be broken when you raise or lower the table.







17 Tomo-link calibration, refer to Tomo-Link Service Manual (Direction: 2133821-100).

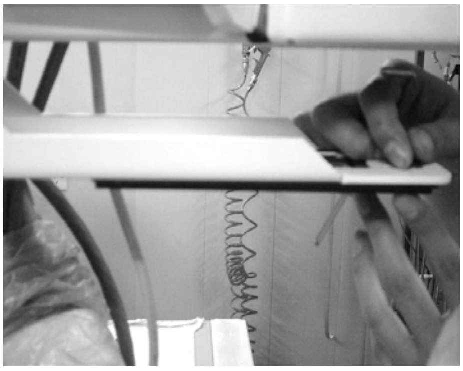
Note: ***Generator Selection must be set to Advantx Style Generator in Section 16.***

PROTEUS XR/a	7/7	IST 025

***Note:* If the X-ray beam and collimator light field are not aligned to the image receptor, you can refer to Step 16 to adjust when necessary.**

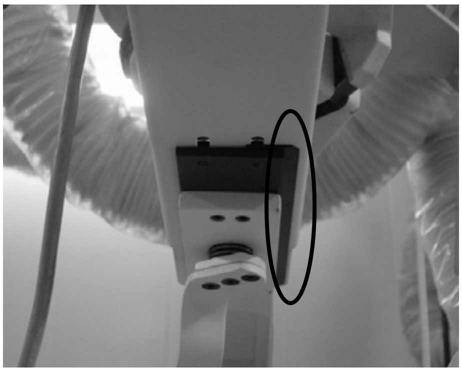
18 Tomo-link position adjustment by insertion of Adjustment Plates.

1) Loosen the two screws on the same side of the Yoke on which the plates should be fixed in.



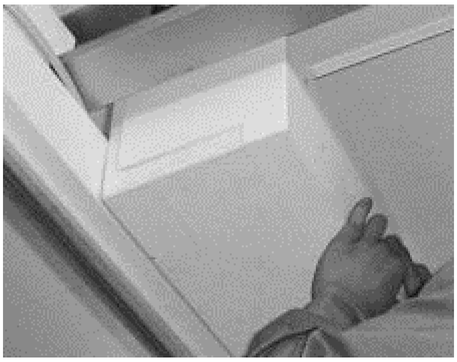
2) Insert suitable sum of plates (1 to 4) into the space between the Yoke and the rubber spacer.

***Note:* Please choose the proper pieces of plates to adjust the alignment between the X-ray beam and image receptor.**



3) Fasten the screws.

19 Put the driver unit cover on.



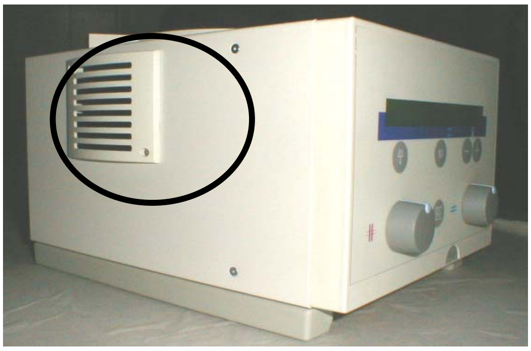
20 Dispose the spare Tomo-link Yoke.

PROTEUS XR/a		**1/2**	**IST 026**
subassembly: **Proteus XR/a Collimator Bulb, Fan Replacement**			
purpose: Installation Procedure			*version no*. 0 *date:* **20/12/99**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **30 min**

Auto collimator

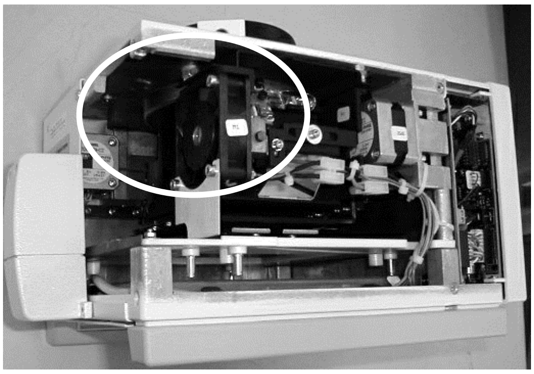
1. Power off the system.
2. Open the side window of collimator.
3. Replace the collimator bulb.

Note: ***Don't touch bulb surface with fingers. Use plastic cover on bulb to install it.***



4. Open the left side cover of collimator, then replace the bulb fan.

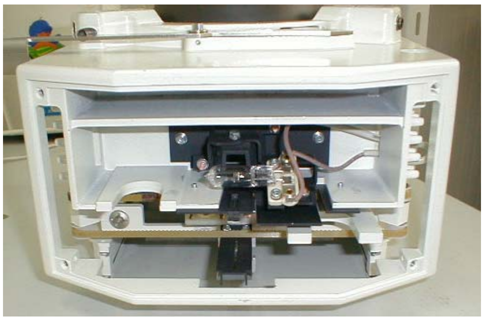
Note: ***This step is just used for Auto-collimator.***



Manual collimator

1. Power off the system.
2. Open the rear cover of collimator.
3. Replace the collimator bulb.

Note: ***Don't touch bulb surface with fingers. Use plastic cover on bulb to install it.***



PROTEUS XR/a	2/2	IST 026

Proteus XR/a Automatic Collimator Bulb Replacement Note

1. ***The Proteus XR/a Automatic Collimator uses a special Collimator light bulb. When the collimator lamp burns out it MUST be replaced with the replacement bulb listed in the Proteus XR/a renewal parts section. Part number 2271727 MUST be used as a replacement bulb. DO NOT use any other lamp as a replacement bulb as X-ray field to Light field alignment may not meet HHS requirements.***
2. ***The Proteus XR/a Collimator bulb is selected to have the filament in the same place in all bulbs, and the position of this filament impacts X-ray field to Light field alignment. This selection process allows the bulb to be replaced by the end user with no alignment required for X-ray to Light field.***
3. ***X-ray field to Light field is adjusted in the factory and will not be affected by bulb replacement if the specified bulb is used as are placement. There is no field adjustment for X-ray field to Light field alignment if another bulb is used.***
4. ***The Proteus XR/a Collimator lamp is designed to operate at 24vac for 150hrscontinuous, other replacement bulbs will burn out very quickly as they are only designed for 50hours continuous use at 24vac.***
5. ***The Laser light has been aligned in the Factory. If you find the laser light needs alignment DO NOT attempt to align the Laser with a screwdriver in the light slot with power applied as this can cause damage to the laser electronics. The Laser is not a field replaceable part and a new collimator should be ordered if there are problems with the alignment or functionality.***

PROTEUS XR/a		**1/1**	**IST 027**
subassembly: **APR Floppy Disk Recovery**			
purpose: Installation Procedure		*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **10 min**

Introduction

This procedure is used when APR disk being lost or broken.

Procedure

1. Prepare a new formatted (Windows 95 or DOS6.22) data floppy disk.

Note: Don't copy system files

2. Power on the system.
3. Press **Procedure Edit** button.
4. Insert the system console SW disk into the floppy Disk Drive.
5. Press **OK** to enter **Procedure edit** mode. See page 5-9 in Proteus XR/a Operator Manual (Direction 2259724-100).
6. Press **Save/Retrieve** button to enter **Save/Retrieve** menu.
7. Take out the system console disk, then insert the new formatted disk.
8. Press **Save Backup** button.
9. Wait until “Retrieving APR data complete” is displayed.
10. Press **EXIT** button to exit this menu. APR disk recovery is done.

PROTEUS XR/a		**1/1**	**IST 028**
subassembly: **OTS Console Replacement**			
purpose: Installation Procedure			*version no*. 0 *date:* **20/12/99**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to* / /	*from* *to*	*Time:* ***0h*** **30 min**

Procedure

1. Remove both side covers and top cover on X-ray tube.
2. Disconnect two OTS Console cables (2259867 and 2258381 for RAD 14, 21 tube, 2391017 and 2391020 for MX100 tube, respectively).
3. Replace the OTS Console.
4. Connect two OTS Console cables.
5. Power on the system.
6. Check the display on OTS Console match the System Console.

Note: ***Ensure the coherent reading is same between the System Console and the OTS Console (Check should be performed with incrementing/decrementing technique factors from the OTS Console).***

7. Power off the system.
8. Put on Tube covers.

PROTEUS XR/a			**1/1**	**IST 029**
subassembly: **System Console Replacement**				
purpose: Installation Procedure			*version no*. 2 *date:* **10/10/2006**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **30 min**	

Procedure

1. Remove and disconnect the covers and cables. This procedure is a reversed procedure of the installation.
2. Replace the System Console.
3. Repeat the installation procedure. Reference to the Job Card IST 010 and IST 011.
4. Power on the system.
5. Check the display on OTS Console match the System Console.

Note: ***Ensure the coherent reading is same between the System Console and the OTS Console.***

CAUTION **The Rev 2.14 or above version of the System Console Software can be used together with either the System I/F board 2375230 (Item #1 of Cabinet 1) or the System I/F Board 2259298-45 and CAN I/F Board 2259298-46.**

WARNING **WARNING LABELS SHOULD BE INCLUDED IN “OPEN ME FIRST” BOX. IF THEY ARE MISSING, PLEASE ORDER A NEW CONSOLE (2259976) IN CONFORMITY WITH REGULATION REQUIREMENTS.**

PROTEUS XR/a			**1/5**	**IST 030**
subassembly: **Proteus XR/a Collimator Eprom update**				
purpose: Proteus XR/a collimator Eprom update			*version no*. 0 *date:* **03/07/2001**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **30 min**	

Before any action, please make sure that the collimator power is disconnected.

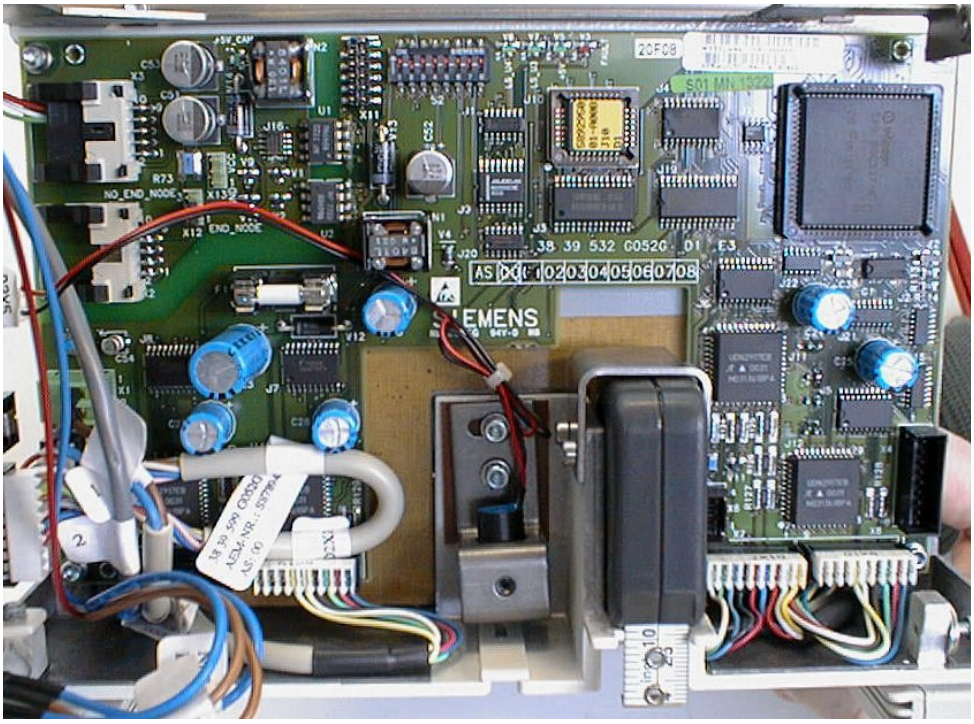
1. Remove the collimator cover:

The cover is fixed with 9 screws (2 mm allen wrench).
First open the srews on the left and on the right side of the collimator (2 on each side).
Next open the 5 screws on the back side of the collimator and remove the two parts of the cover.

2. Open the collimator front panel:

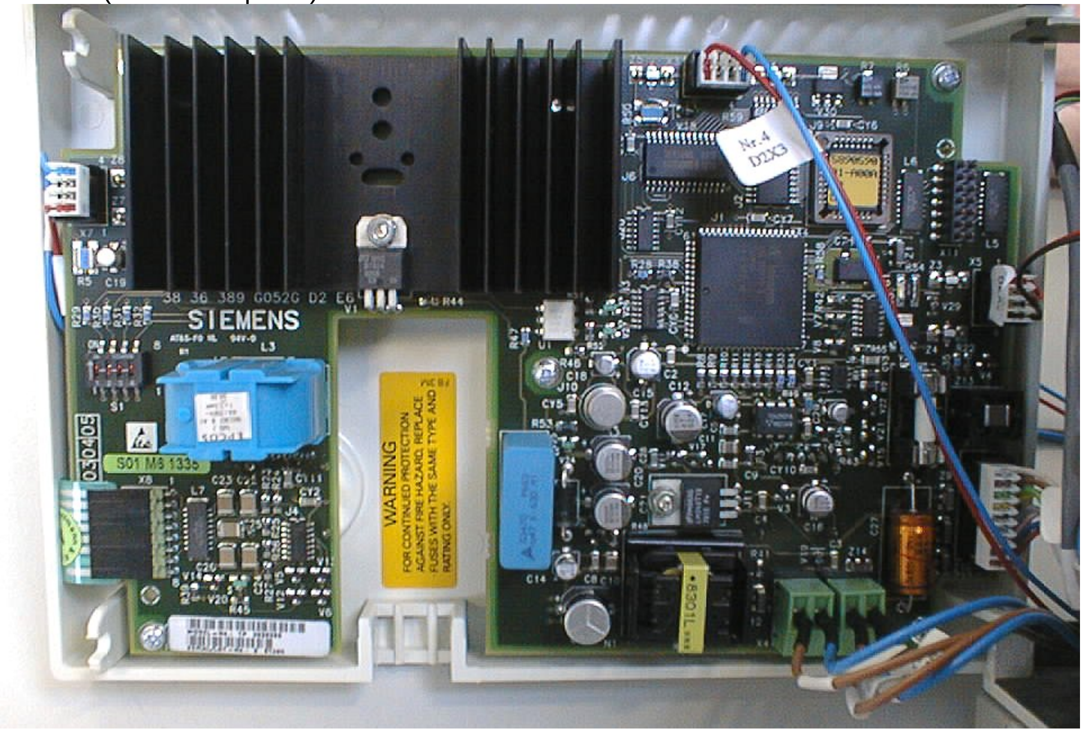
The front panel is fixed with 2 screws (2.5 mm allen wrench).
Open the 2 screws on the right side and open the front panel.
The two boards (D1, D2) of the collimator are now visible:

D1-Board:

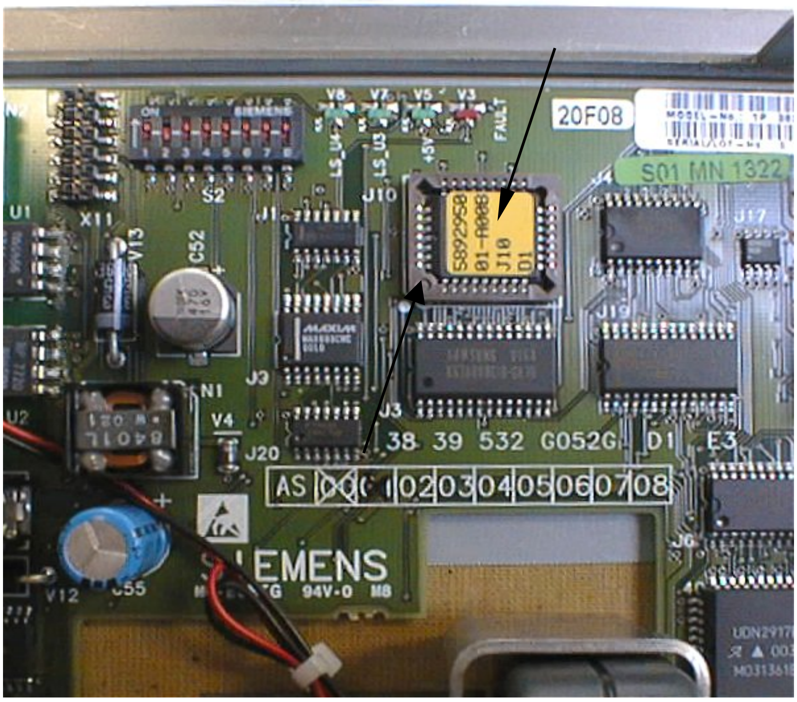


PROTEUS XR/a	2/5	IST 030

2-Board (in the front panel)

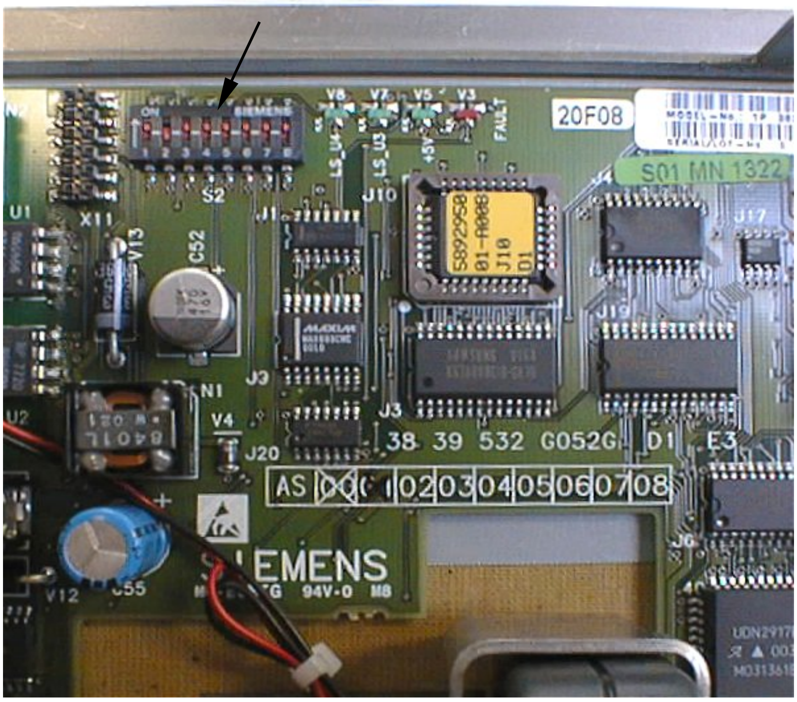


3. Update the software of the D1-Board:


J10
S892958
01-A008
J10
D1
38 39 532 G052G D1 E3
SIEMENS

Pull the Eprom from socket J10 and plug the new one which is labeled J10-D1.
Note: ***The Eprom fits only in one position (look for the slant sides of the Eprom and the socket).***

4. Verify the setting of the DIP switch S2 on the D1-Board:

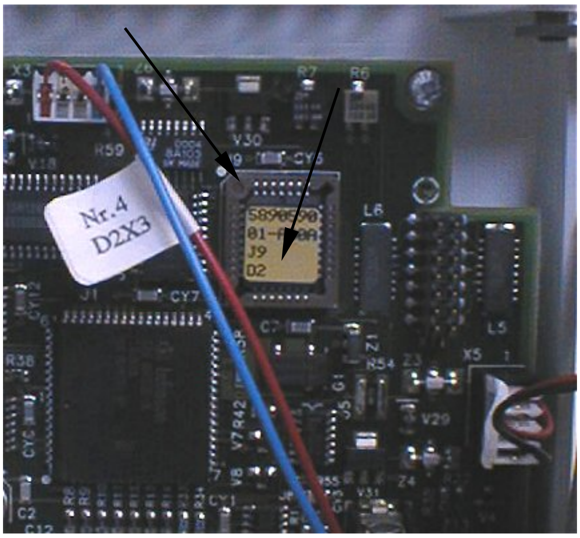

S2
V8
V7
V5
V3
FAULT
LS_U4
LS_U3
+5V
20F08
S01 MN 1322
J10
J11
U1
X11
V13
C52
J17
J19
J3
N1
V4
J20
U2
38 39 532 G052G
D1
E3
AS 01 02 03 04 05 06 07 08
SIEMENS
94V-0
J6
V12
C55
UDN2917

The DIP switch S2 on the D1-board must be set as follows:

S2.1 = ON
S2.2 = OFF
S2.3 = ON
S2.4 = ON
S2.5 = ON for AL01C
S2.5 = OFF for AL01F
S2.6 = ON
S2.7 = ON
S2.8 = ON

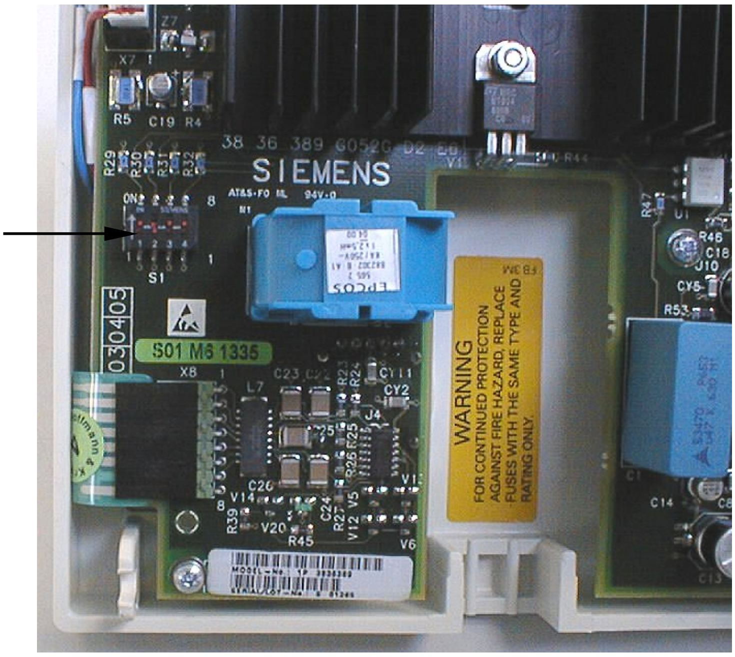
PROTEUS XR/a	4/5	IST 030

5. Update the software of the D2-Board:


Nr.4
D2X3
J9
D2

Pull the Eprom from socket J9 und plug the new one which is labeled J9-D2.
Note: ***The Eprom fits only in one position***
(Look for the slant sides of the Eprom and the socket).

6. Verify the setting of the DIP switch S1 on the D2-Board:


SIEMENS
ON
S1
WARNING
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE FUSES WITH THE SAME TYPE AND RATING ONLY.

The DIP switch S1 on the D2-board must be set as follows:
S1.1 = ON
S1.2 = OFF
S1.3 = ON
S1.4 = ON

7. Close the collimator front panel:

Close the front panel and fix it with 2 screws (2.5 mm allen wrench).

8. Add the collimator cover

Add the two parts of the cover to the collimator and fix it with 9 screws (2 mm allen wrench).

PROTEUS XR/a			**1/1**	**IST 031**
subassembly: **Jedi Generator**				
purpose: KV Control Board replacement			*version no*. 0 *date:* **23/01/03**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h*** **30 min**	

1. Load software file on Service Laptop (Refer to Job Card SW JEDI 7-4, Chapter 4).
2. If possible, download and save your local database (Refer to Job Card CAL JEDI 8-6, Chapter 4).
   If you have a backup database on the site you can use it.

3. Replace the defective kV control board with the new one (Refer to Job Card D/R JEDI 17-48, Chapter 9).

Note: Pay attention to Write the existing number on the failed kV control board to the blank label, and stick it on the new kV control board.

4. Restore Database (Refer to Job Card CAL JEDI 8-6, Chapter 4)
   - Up-to-date database if available
   - Most recent or originally saved Data Base if available
   - Default one from the floppy delivered with the equipment in the Service Tool set.

Note: Pay attention to verify the software version and ensure its compliance with the KV control board and X-ray tube type (refer to Job Card IST JEDI 5-2, Chapter 4).

Alternately, you may try to swap the NVRAM chip (U32) from the former to the new KV Control board to keep all the parameters (Refer to Job Card PM JEDI 15-2, Chapter 8). If this chip is not involved in the failure or the cause for replacement, it will allow to keep up-to-date data.

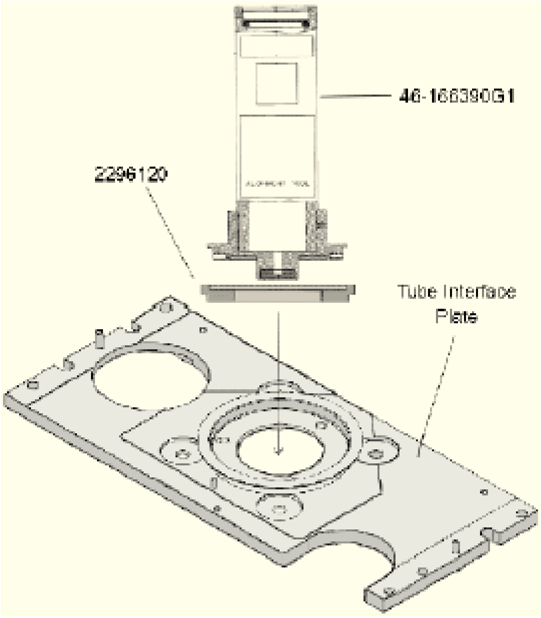
5. Calibrate:
   - Perform several exposures on both focuses in several workstations, with exposure time longer than 12.5 ms

If default database was restored, it is necessary to resume room set up (refer to Job Card CAL JEDI 8-4, Chapter 4) and AEC calibration (if present) (refer to Job Card CAL JEDI 8-2, Chapter 4). Then perform the checksum (refer to Job Card CAL JEDI 8-5,Chapter 4).

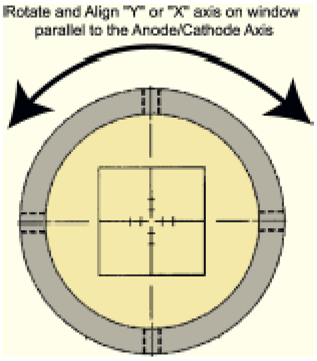
6. Save Database on the service floppy delivered with the equipment (refer to Job Card CAL JEDI 8-6, Chapter 4).

PROTEUS XR/a		**1/2**	**IST 032**
subassembly: **OTS**			
purpose: MX100 X-ray tube-Collimator Interface Plate Alignment			*version no*. 0 *date:* **7/03/03**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to* / /	*from* *to*	*Time:* ***0h* 30 min**

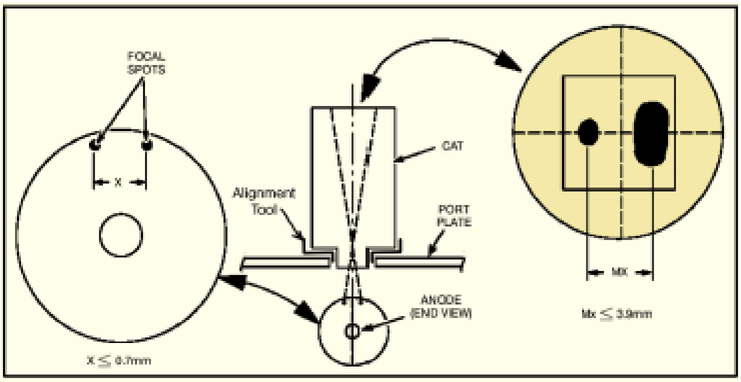
1. Proceed Alignment between tube and tube/collimator interface plate.
   1) Obtain the following focal spot alignment tools:
      - A Collimator Alignment Tool 46-166390G1
      - Hex Wrench, 46-165137P1
      - An alignment tool adapter 2296120.
   2) Place the Alignment tool adapter (2296120) on the tube/collimator interface plate.
   3) Place the Collimator Alignment Fixture (46-166390G1) into the tool adapter ring.

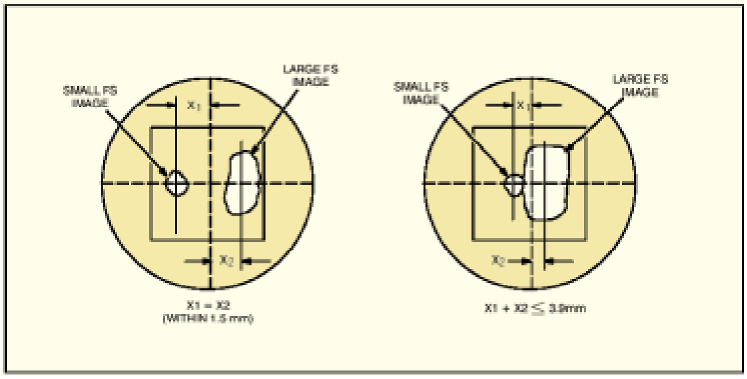

46-166390G1
2296120
Tube Interface Plate

   4) Rotate the Collimator Alignment Fixture (46-166390G1) until the grid axis (y or x) is parallel to the axis of the tube's cathode/anode.

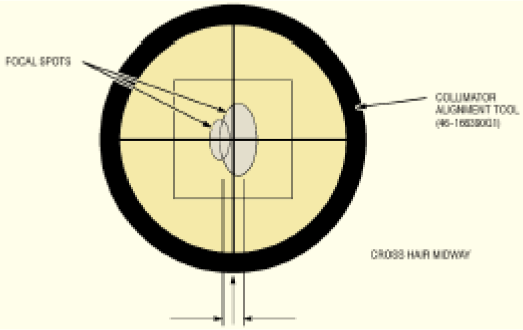

Rotate and Align "Y" or "X" axis on window parallel to the Anode/Cathode Axis

5) Take an exposure with both Xs and Xl focal spot.


FOCAL SPOTS
X
X ≤ 0.7mm
Alignment Tool
CAT
PORT PLATE
ANODE (END VIEW)
MX
Mx ≤ 3.9mm


SMALL FS IMAGE
LARGE FS IMAGE
X1
X2
X1 = X2 (WITHIN 1.5 mm)
SMALL FS IMAGE
LARGE FS IMAGE
X1
X2
X1 + X2 ≤ 3.9mm

6) Adjusts the position of the x-ray tube relative to the tube/collimator interface plate.
7) To make tube position adjustments, loosen the four socket head cap screws (See illustration on Page 2-63 or Page 2-68.) 1/4 turn counterclockwise. The screws retain the x-ray tube to tube/collimator interface plate.
8) Move the x-ray tube until the cross hairs in the alignment tool window are midway between the two focal spots displayed.


FOCAL SPOTS
COLLIMATOR ALIGNMENT TOOL (46-168390G1)
CROSS HAIR MIDWAY

9) Make certain the concentricity of tube/collimator interface plate, OTS console bracket and tube window.
10) After adjustment, torque each of the four mounting screws to the same force.
11) Remove the Alignment Fixtures.

Note: ***Apply locktite to tube/collimator interface plate mount screws.***

Note: ***Apply grease supplied underneath the edge of tube/collimator interface plate and the inside surface of the adapter on collimator for easy movement.***

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CHAPTER 4 CALIBRATION AND CONFIGURATION

SECTION 1 TABLE OF JOBCARDS CONTENTS

JOBCARD NUMBER	CONTENT	VERSION	PAGE
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CAL 002	SET SYSTEM CONFIGURATION	2	4-4
CAL 003	TABLE INHIBITION BUTTON SETTING AND ANTI-COLLISION BUZZER FUNCTION	0	4-7
CAL 004	ADJUST ANTI-COLLISION SWITCHES	0	4-9
CAL 005	CALIBRATE TABLE HEIGHT LIMITATION	0	4-11
CAL 006	CALIBRATE SID CALIBRATION	1	4-12
CAL 007	CALIBRATE CASSETTE SIZE DISPLAY	1	4-24
CAL 008	WALL STAND (GPCP No. 600-0301), SG100 WALL STAND (GPCP No. 2225849), and SG120 WALL STAND (GPCP No. 2402562) COUNTERWEIGHT CALIBRATION	1	4-26
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CAL 010	HHS TEST CALIBRATION	1	4-31
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SW JEDI 7-2	SOFTWARE DOWNLOAD / UPGRADE	1	4-40
SW JEDI 7-3	TUBE REPLACEMENT SOFTWARE PROCEDURE	0	4-44
IST JEDI 5-2	TUBE CONFIGURATION	1	4-49
CAL JEDI 8-4	WORK STATION PARAMETER	0	4-52
CAL 011	X-RAY TUBE WARM UP	0	4-59
CAL JEDI 8-2	AUTOMATED AEC CALIBRATION	0	4-60
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CAL 013	LIGHT FIELD – X-RAY FIELD ALIGNMENT (FOR PROTEUS XR/A COLLIMATOR ONLY)	1	4-90
CAL 014	CALIBRATE PROTEUS XR/A COLLIMATOR BULB	0	4-93
CAL 015	CALIBRATE PROTEUS XR/A MANUAL COLLIMATOR BULB AND ITS VOLTAGE	0	4-94
CAL 016	CALIBRATE SG120 WALL STAND VERTICAL LOCKS	0	4-95

SECTION 2 JOBCARDS CONTENTS

PROTEUS XR/a			**1/1**	**CAL 001**
subassembly: **Introduction**				
purpose: Calibration and Configuration			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **10 min**	

Sequence

Calibration must be completed before functional checks to components can be performed.

Procedures
System Power On

Apply power to the Proteus XR/a system.

Document Modifications

Do not attempt to run Jedi Service Mode without first marking your Cal Users Guide manual to reflect changes covered in the Proteus XR/a Release Notes. Failure to do so may cause some Service Mode Units to operate incorrectly.

Note: Refer to Jedi Generator part of the Service manual.

Factory-Calibrated Proteus XR/a Systems

The majority of the system calibration was performed at the factory. Therefore, only the unchecked procedures need to be run. Should there be any problems with any of the factory settings, we recommend that only those units required to correct the problem be run.

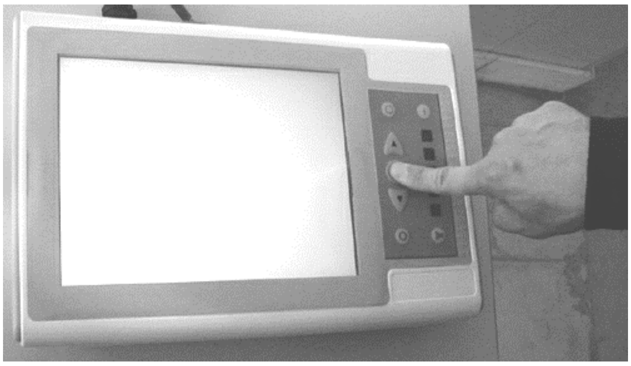
<table>
<tr><td colspan="3">PROTEUS XR/a</td><td>1/4</td><td>CAL 002</td></tr>
<tr><td colspan="5"><i>subassembly</i>: Set system Configuration</td></tr>
<tr><td colspan="3">purpose: Calibration and Configuration</td><td colspan="2"><i>version no</i>. 3
<i>date:</i> 30/11/07</td></tr>
<tr><td><i>NF No.</i></td><td><i>Production date</i></td><td><i>Serial No.</i></td><td colspan="2"><i>Personnel:1</i></td></tr>
<tr><td></td><td><i>from / /</i>
<i>to / /</i></td><td><i>from</i>
<i>to</i></td><td colspan="2"><i>Time:</i> 15 min</td></tr>
</table>

1 INTRODUCTION:

Test if system configuration is accordance with the system hardware setting.

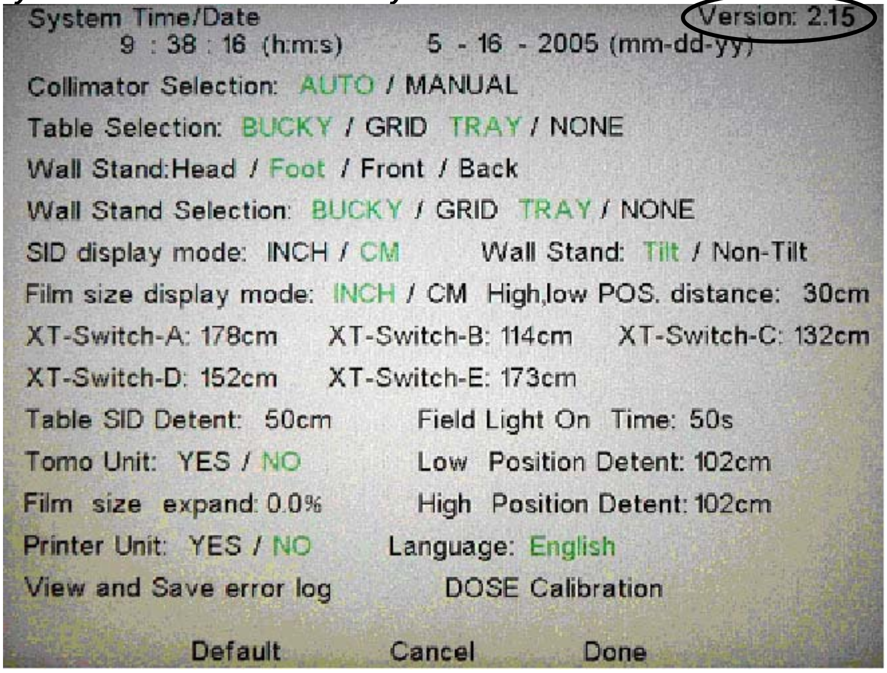
2 TOUCH SCREEN CONFIGURATION:

1. Press and hold the quick up/down key, at the same time power on the system until the service mode appear on the touch screen.



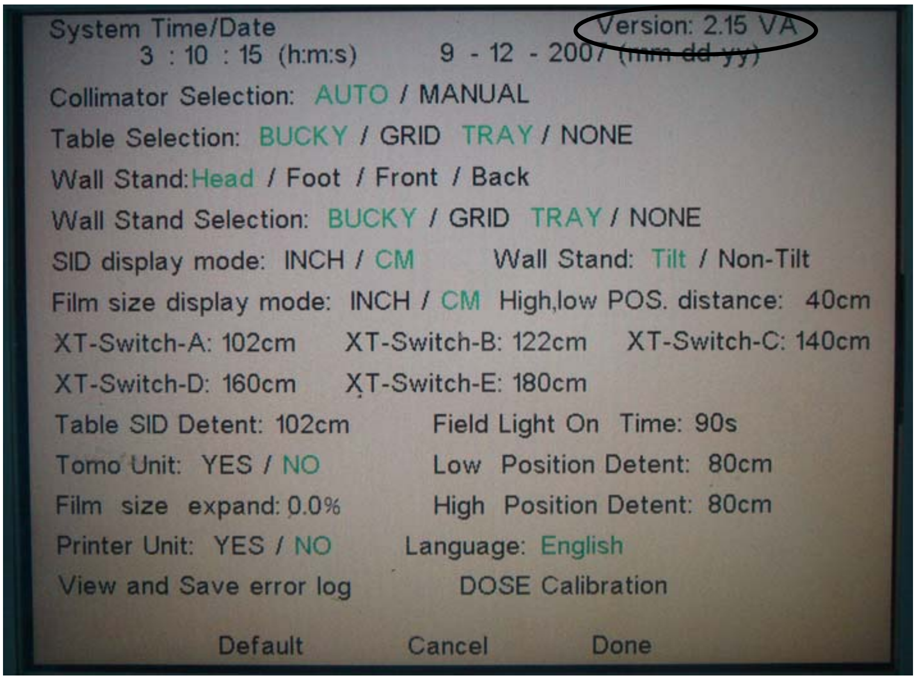
2. The initial parameters were set at factory. The field engineer needs to re-calibrate the system configuration according to requirements.

Note: The System Console Software version is 2.15.
The parameters shown in the illustration below are not the default configuration in factory. The illustration is used only to show the interface.



System Time/Date Version: 2.15
9 : 38 : 16 (h:m:s) 5 - 16 - 2005 (mm-dd-yy)
Collimator Selection: AUTO / MANUAL
Table Selection: BUCKY / GRID TRAY / NONE
Wall Stand:Head / Foot / Front / Back
Wall Stand Selection: BUCKY / GRID TRAY / NONE
SID display mode: INCH / CM Wall Stand: Tilt / Non-Tilt
Film size display mode: INCH / CM High,low POS. distance: 30cm
XT-Switch-A: 178cm XT-Switch-B: 114cm XT-Switch-C: 132cm
XT-Switch-D: 152cm XT-Switch-E: 173cm
Table SID Detent: 50cm Field Light On Time: 50s
Tomo Unit: YES / NO Low Position Detent: 102cm
Film size expand: 0.0% High Position Detent: 102cm
Printer Unit: YES / NO Language: English
View and Save error log DOSE Calibration

Note: For VA site, the system console software version is 2.15VA.
The parameters shown in the illustration below are not the default configuration in factory. The illustration is used only to show the interface.
To check Anode Heat Integrator Function, please refer to section 8 in Chapter 5.



System Time/Date
3 : 10 : 15 (h:m:s) 9 - 12 - 2007 (mm-dd-yy) Version: 2.15 VA

Collimator Selection: [✓ AUTO] / MANUAL

Table Selection: [✓ BUCKY] / GRID [✓ TRAY] / NONE

Wall Stand: [✓ Head] / Foot / Front / Back

Wall Stand Selection: [✓ BUCKY] / GRID [✓ TRAY] / NONE

SID display mode: INCH / [✓ CM] Wall Stand: [✓ Tilt] / Non-Tilt

Film size display mode: INCH / [✓ CM] High,low POS. distance: 40cm

XT-Switch-A: 102cm XT-Switch-B: 122cm XT-Switch-C: 140cm

XT-Switch-D: 160cm XT-Switch-E: 180cm

Table SID Detent: 102cm Field Light On Time: 90s

Tomo Unit: YES / [✓ NO] Low Position Detent: 80cm

Film size expand: 0.0% High Position Detent: 80cm

Printer Unit: YES / [✓ NO] Language: [✓ English]

PROTEUS XR/a	3/4	CAL 002

3. Set the parameter according to following table.

No.	Input/Action	Remarks
1	Press Time & Date	Use up/down key set system date and time.
2	Press collimator selection	Select AUTO or MANUAL collimator.
3	Table selection	Set table have or have not Bucky.
4	Wall Stand	Set wall stand position: HEAD/ FOOT/FRONT/BACK; Center or Offset.
5	Wall Stand Selection	Set wall have (BUCKY) or have not Bucky (GRID) and sensor tray (TRAY) or no sensor tray (NONE).
6	SID display mode	Set SID unit: INCH or CM.
7	Wall Stand	Select tilting Wall stand (SG100 or SG120) or non tilt Wall stand.
8	Film size display mode	Set film unit is INCH OR CM, if SID unit in CM. But if SID unit is INCH, film size unit must be INCH, film size unit on OTS must be accordance with it.
9	High, low POS. distance	Set distance between Low Auto Exposure position and High Auto Exposure position of SG100 Wall Stand between 20-100cm (8-39inch). (for auto exposure with Bucky in horizontal position). Default value is 40cm. ***Note: The default value of High, low POS. distance set in System Console is 40cm, which is different from the default distance between Low Auto Exposure position and High Auto Exposure position set on SG100 or SG120 Wall Stand (44cm). So it's a must to check and change the High, low POS. distance value in System Console and ensure it to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position when installing the SG100 or SG120 Wall Stand and performing the SG100 or SG120 SID calibration, even if the positions of the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam are not modified and be on the default positions. (refer to Job Card IST008 in Chapter 2 and Job Card CAL006 in Chapter 4)***
10	Wall Stand detent position XT-Switch-A (B, C, D, E) set	Change the value can set wall stand detent SID display 50-200cm(20-78inch).
11	Set Table SID Detent value	Set table detent value between 50-200cm(20-78inch).
12	Field Light On Time	Set field light on time from 30s to 90s. (The step is 10s) This is not applicable to the manual collimator.
13	Tomo Unit	Set have or not have Tomo function.
14	Low Position Detent	Set Low Auto Exposure position SID of SG100 or SG120 Wall Stand (for auto exposure with Bucky in level) between 50-200cm (20-78inch).
15	High Position Detent	Set High Auto Exposure position SID of SG100 or SG120 Wall Stand (for auto exposure with Bucky in level) between 50-200cm (20-78inch).
16	Film Size Expand: 0.0%, 1.0% or 1.5%	Set film size increment. This function allows the FE to adjust the collimator blades opening slightly.
17	Set Printer Unit	Set have or not have print unit.
18	Language	9 languages can be selected. The relative APR data and APR name should be displayed in console interface.
19	View and save error log	Display error messages and save error.log to the floppy.
20	DOSE Calibration	See Job Card CAL 012.
21	Press Default	Display Default configuration value.
22	Press Cancel	Not save the current configuration and exit this interface
23	Press Done	Save the current configuration and exit the interface

Note: From SW version 2.07, the Wall Stand allows to be placed in 90 degrees to the table, please select the Wall Stand position as "Front" or "Back". Be sure to place the Wall-XT Switches on the bridge instead of on the rail, and place the Wall Center on the rail.

4. Press DONE to confirm the calibration then go to main screen.
   Press CANCEL to cancel the calibration then go to main screen.
   Press DEFAULT to recover initial value.

3 OTS DETENT CODE:

1. Mount the magnet bar onto stationary rail and bridge.

Note: Please refer to the room layout in Pre-Installation Manual (2260326-100).

the wall center and table center detent code is same:

■	■	■	■	▬	
0	1	2	3		NOTE
0	X	0	X	X	Table & Wall
0	0	X	0	X	Wall-XT-Switch A
X	0	X	0	X	Wall-XT-Switch B
0	X	X	0	X	Wall-XT-Switch C
X	X	X	0	X	Wall-XT-Switch D
X	X	0	0	X	Wall-XT-Switch E

the wall center and table center detent code is different:

■	■	■	■	▬	
0	1	2	3		NOTE
0	X	0	X	X	Table center
0	0	X	X	X	Wall center
0	0	X	0	X	Wall-XT-Switch A
X	0	X	0	X	Wall-XT-Switch B
0	X	X	0	X	Wall-XT-Switch C
X	X	X	0	X	Wall-XT-Switch D
X	X	0	0	X	Wall-XT-Switch E

Note: The magnet red face upwards.

PROTEUS XR/a		**1/2**	**CAL 003**
subassembly: **Table Inhibition Button Setting and Anti-collision Buzzer Function**			
purpose: Configuration		*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* **20 min**

Introduction

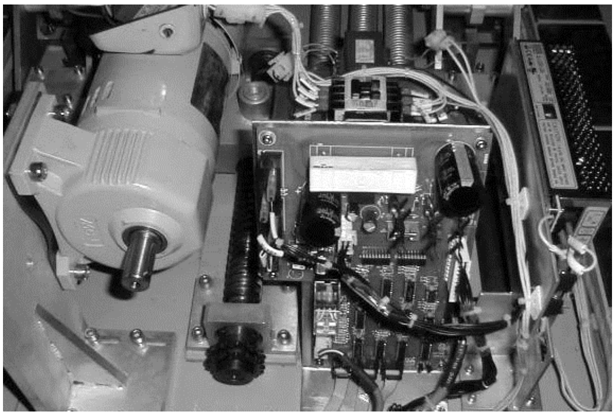
This Jobcard describes how to adjust initial setting of table inhibition button and anti-collision buzzer function. (This function is available on Rev 01 or later version PCB)

Table Inhibition Button Setting

When power on the system, the default setting of table inhibition button is on. If you want to operate the table, you will need to deselect this button.

The following procedures describe how to adjust the initial setting of table inhibition button.

1. Power on the elevating table.
2. Raise the table to its highest position.
3. Take off the right side table cover.
4. Now, you will see a PCB board.
5. Make the Jumper on JP1 connecting the middle pin and the empty pin. (See following design drawing)



Inhibit Anti-collision Buzzer Function

The following procedures describe how to remove anti-collision buzzer function.

1. Power on the elevating table.
2. Raise the table to its highest position.
3. Take off the right side table cover.
4. Remove the Jumper on JP2.

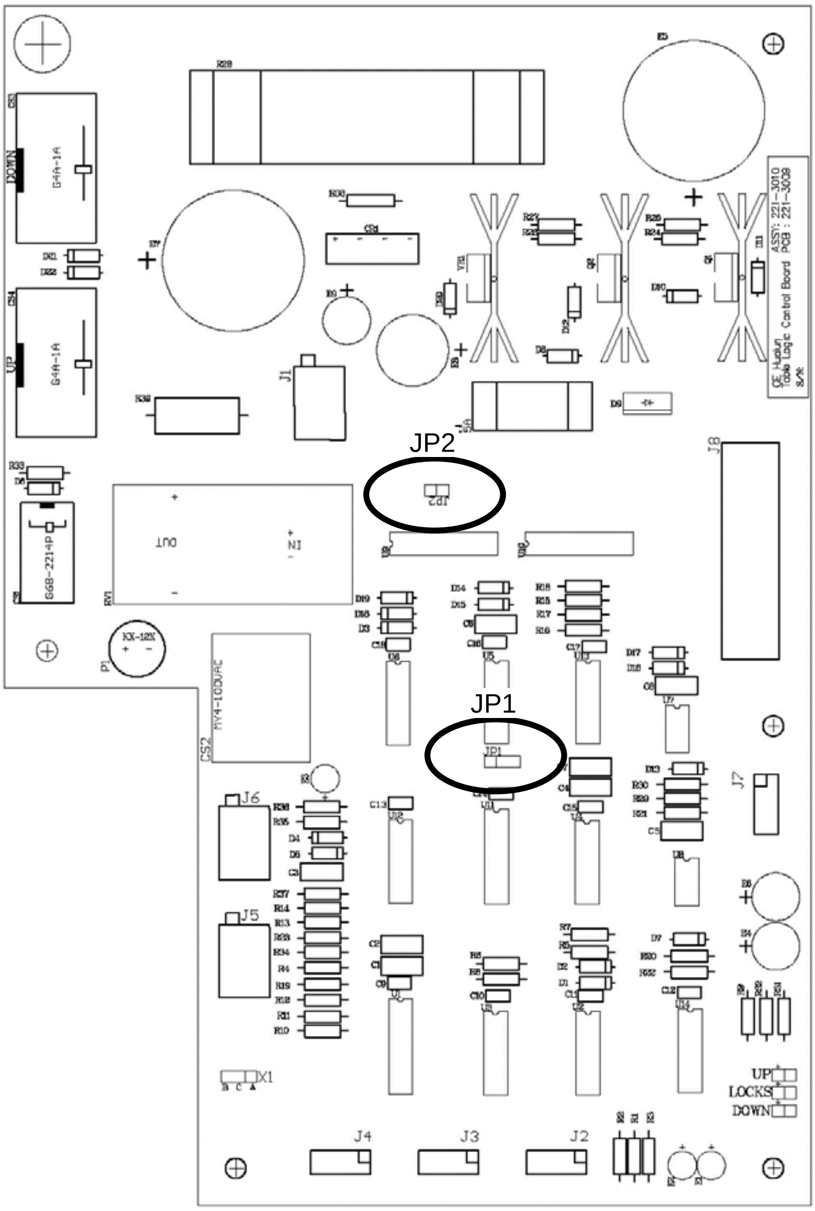

JP2
JP1
J1
J2
J3
J4
J5
J6
J7
J8
X1
UP
LOCKS
DOWN
G4A-1A
G6B-2214P
MY4-100VAC
KX-12N
OUT
IN
ASSY: 221-3010
PCB : 221-3009

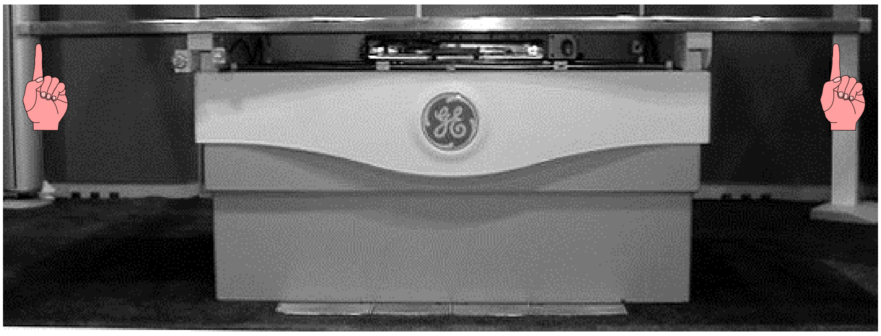
Table logic control board 221-3010 Rev1

PROTEUS XR/a			**1/2**	**CAL 004**
subassembly: **Adjust Anti-collision Switches**				
purpose: Calibration and Configuration			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **40 min**	

The anti-collision switches have already been adjusted at the factory. The following procedure is needed to perform when table downward motion is prohibited or anti-collision switches don't work.

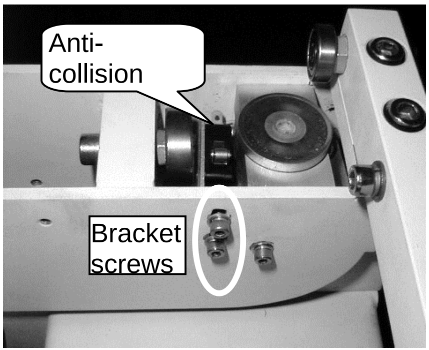
Malfunction Analyze

1. Power on the elevating table.
2. Lower the table height, at the same time, use a force gauge to hold back table motion under each corner of table top frame.
3. When the force exceed 45lbs, the table should stop motion, otherwise, that anti-collision switch isn't working correctly.

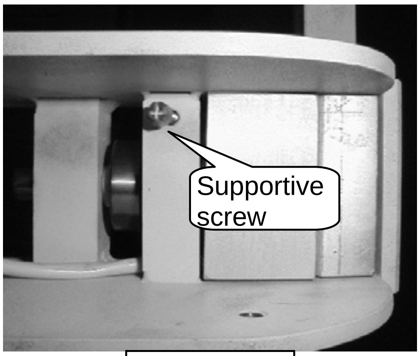


PROTEUS XR/a	2/2	CAL 004

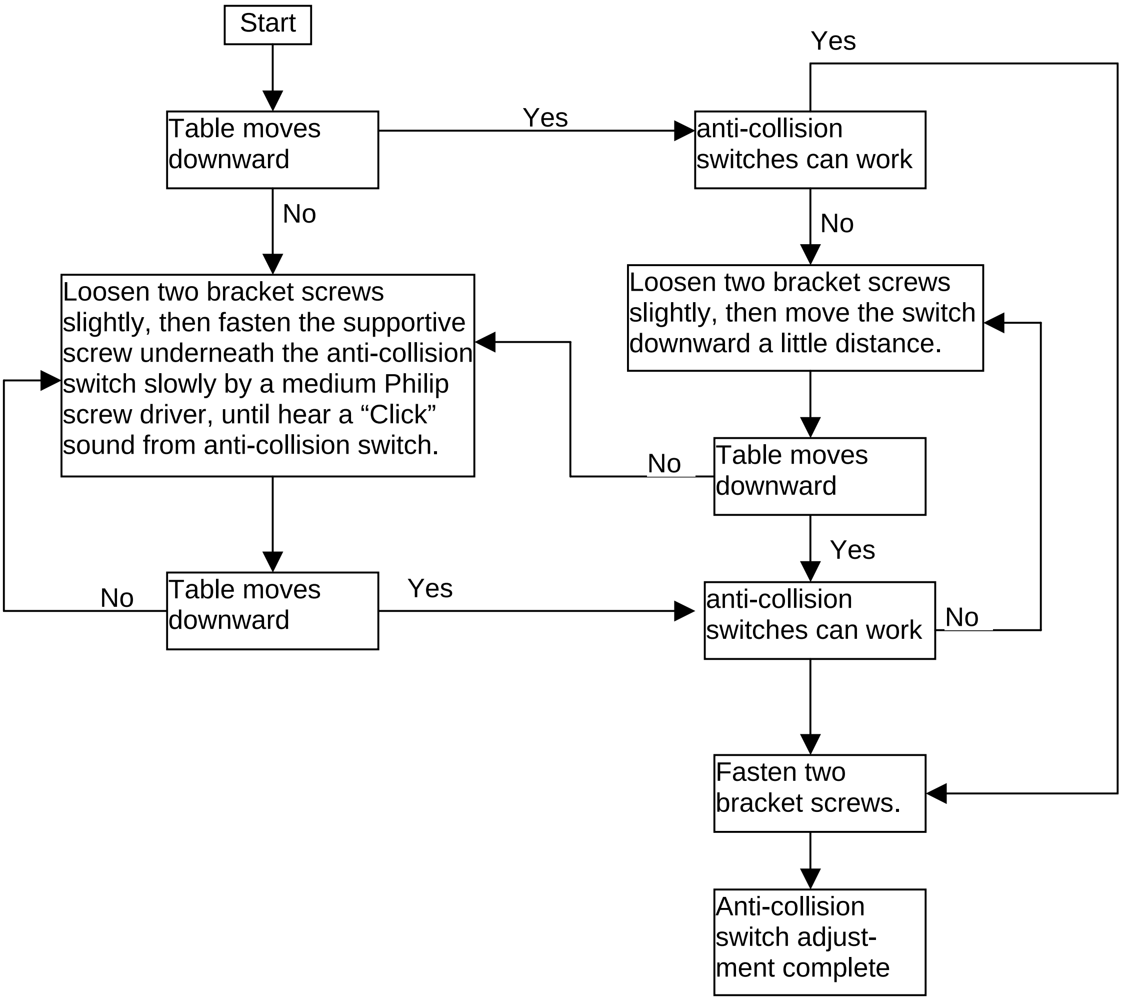
Procedure


Anti-collision
Bracket screws

Top view


Supportive screw

Bottom view

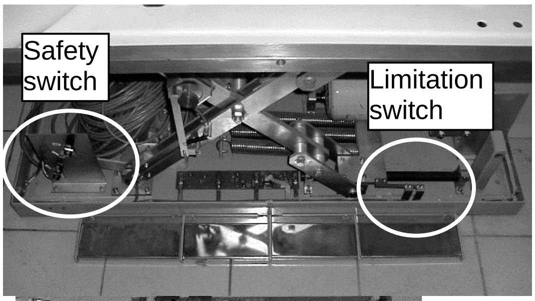

Start
Table moves downward
Yes
anti-collision switches can work
Yes
No
No
Loosen two bracket screws slightly, then fasten the supportive screw underneath the anti-collision switch slowly by a medium Philip screw driver, until hear a “Click” sound from anti-collision switch.
Loosen two bracket screws slightly, then move the switch downward a little distance.
No
Table moves downward
Yes
No
Table moves downward
Yes
anti-collision switches can work
No
Fasten two bracket screws.
Anti-collision switch adjust-ment complete

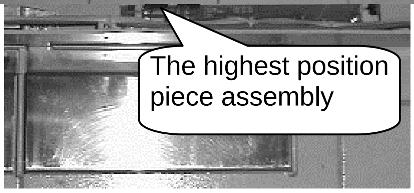
PROTEUS XR/a			**1/1**	**CAL 005**
subassembly: **Calibrate Table Height Limitation**				
purpose: Calibration and Configuration			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:*	
	from / / *to / /*	*from* *to*	*Time:* **30 min**	

The table height limitation calibration was already performed at the factory and the table height is from 550mm (560mm for table with Toe jam sensor) to 800mm. The following procedure should be performed in case table height does not meet specification.

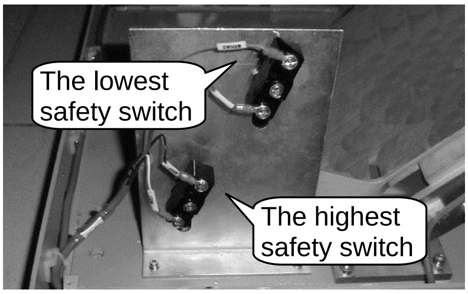
Procedures

1. Open the front cover of table base.
   There are two sets of switches. One set is table height limitation switch; the other set is safety switch for limitation switch in case limitation switch can’t work.



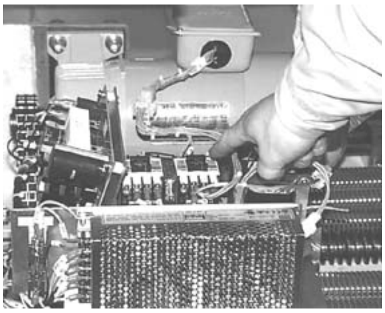


2. Analyze whether is the highest position or the lowest position not correct, and then adjust the corresponding detector position of "position piece assembly".



3. If the adjustment doesn’t work, widen the corresponding safety switch limitation scale. Keep the safety switch limitation scale 10mm larger than table height specification to 550mm-810mm.
4. Adjust detector again. Then check whether table height meets the specification. If not, do step 2 again.
5. Fasten both limitation detectors and safety switches

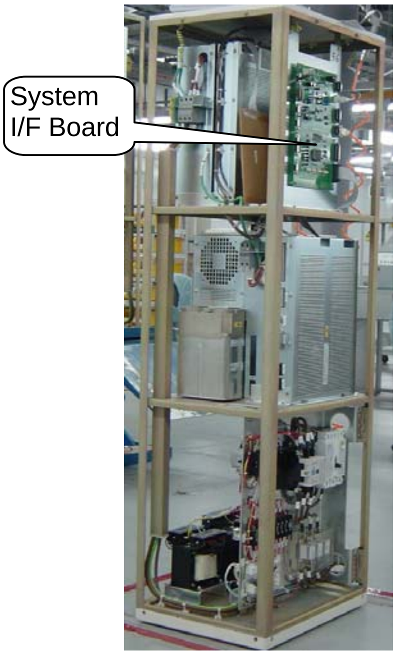
Note: In case the lower safety switch is tripped, remove the side cover to reach and press the contactor to drive the table up.



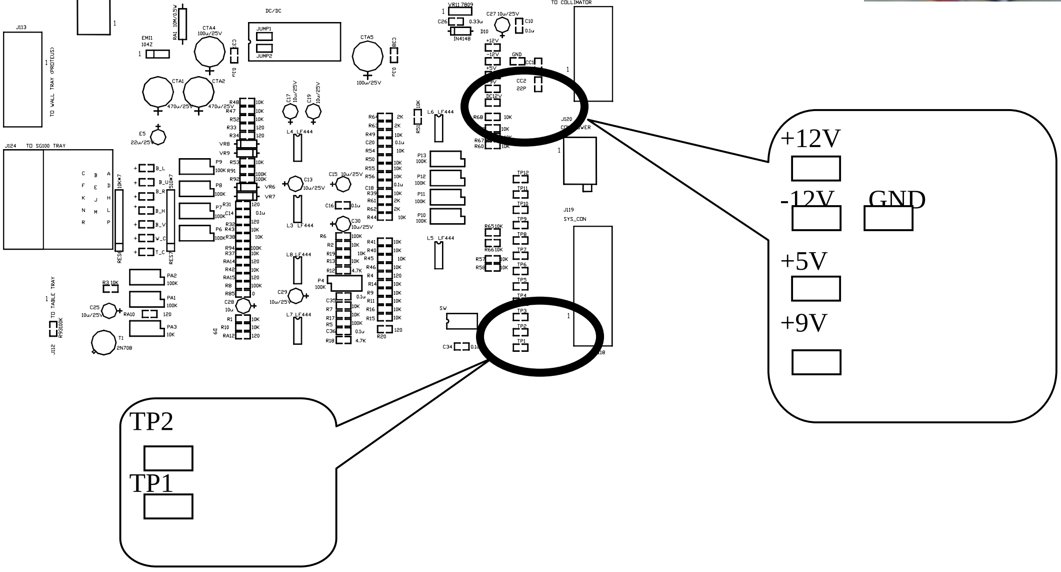
PROTEUS XR/a			**1/12**	**CAL 006**
subassembly: **Calibrate SID Calibration**				
purpose: Calibration and Configuration			*version no*. 1 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to* / /	*from* *to*	*Time:* **30 min**	

Section 1 SID calibration procedure: (For systems with Table)

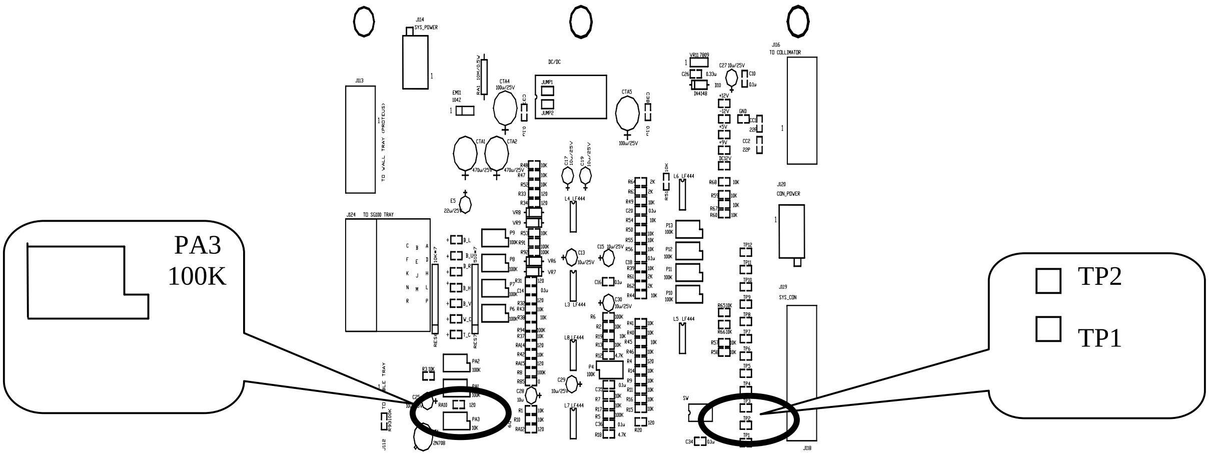
Note: The inaccuracy between displayed SID and real value should less than 1.7%.



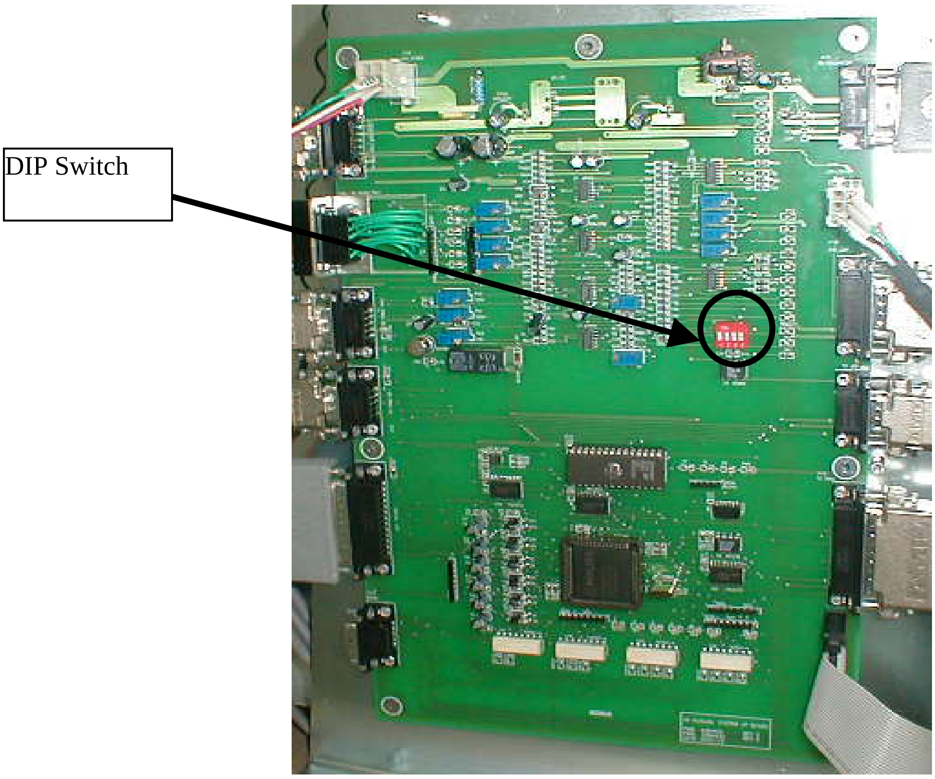
1. When the table is in its' highest position, verify that the mark on table height potentiometer is in alignment with mark on the rack.
2. Open the front cabinet cover by loosing two screws underneath the cover.
3. Disconnect the connector J110 in system I/F board and measure the resistance between pin1 and pin2.
   When the table is in the highest position, it should be 40±10Ω. When the table is in the lowest position, it should be 765+/-10Ohms for the table with Toe Jam Sensors, or 795+/-10Ohms for the table without Toe Jam Sensors.
4. Check the cables are connected correctly. Refer to the system MIS map in page 10-1.
5. Power on and check the +5VDC±5%, +/-12VDC±5% on the system IF board.



6. Set table top mode using OTS console or System console.


PA3
100K
TP2
TP1

Note: ***Ensure the switch 1, 2 of the DIP Switch in red color to be on.***



7. With the table in its lowest position drive to the highest position, verify the SID display on the OTS console is changing during entire travel range without rolling over (continuous pot).
   Adjust PA1 if the SID doesn't change.

Note: ***Raise the table to its highest position. Then adjust PA1 until TP1 is about 0.93V***.

8. Verify the SID display on the OTS console is changing while driving the OTS up and down.
   Adjust PA3 if the SID doesn't change.

Note: ***Raise the OTS to its highest position. Then adjust PA3 until TP2 is about 0.89V***.

9. Drive the table to the height of 58cm and write down the SID value shown on OTS console. Drive the table to the highest position. Adjust the PA1 so that the OTS console SID changes 22cm(Table height is from 58cm to 80cm).
10. Repeat step 9 until SID changing is the same as actual moving distance.

11. Drive the OTS to the 100cm SID (from table top) using the measure tape on collimator and write down the SID value shown on OTS console. Lower the OTS to 70cmSID (from table top) using measure tape. Adjust the PA3 so that the OTS console SID changes 30cm.
12. Repeat step 11 until SID changing is same as real moving distance.

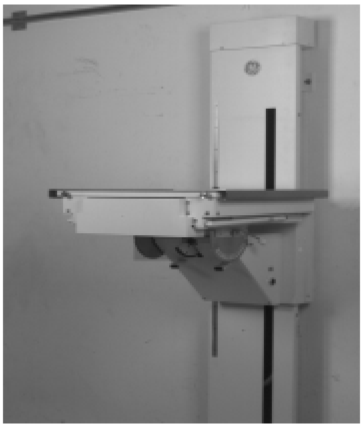
13. Repeat step 9 to 12 until both of table and OTS SID values changing reflect the real moving distance.

14. Adjust P5 until the right SID is displayed on the OTS console.

FOR SG100 WALL STAND SID CALIBRATION, CONTINUE WITH FOLLOWING STEPS. IF SG100 IS NOT SELECTED, IT'S ENOUGH TO PERFORM THE STEP 1 TO 14 ONLY FOR SID CALIBRATION.

FOR SG120 WALL STAND SID CALIBRATION, SKIP TO STEP 20 DIRECTLY. IF SG120 IS NOT SELECTED, IT'S ENOUGH TO PERFORM THE STEP 1 TO 14 ONLY FOR SID CALIBRATION.

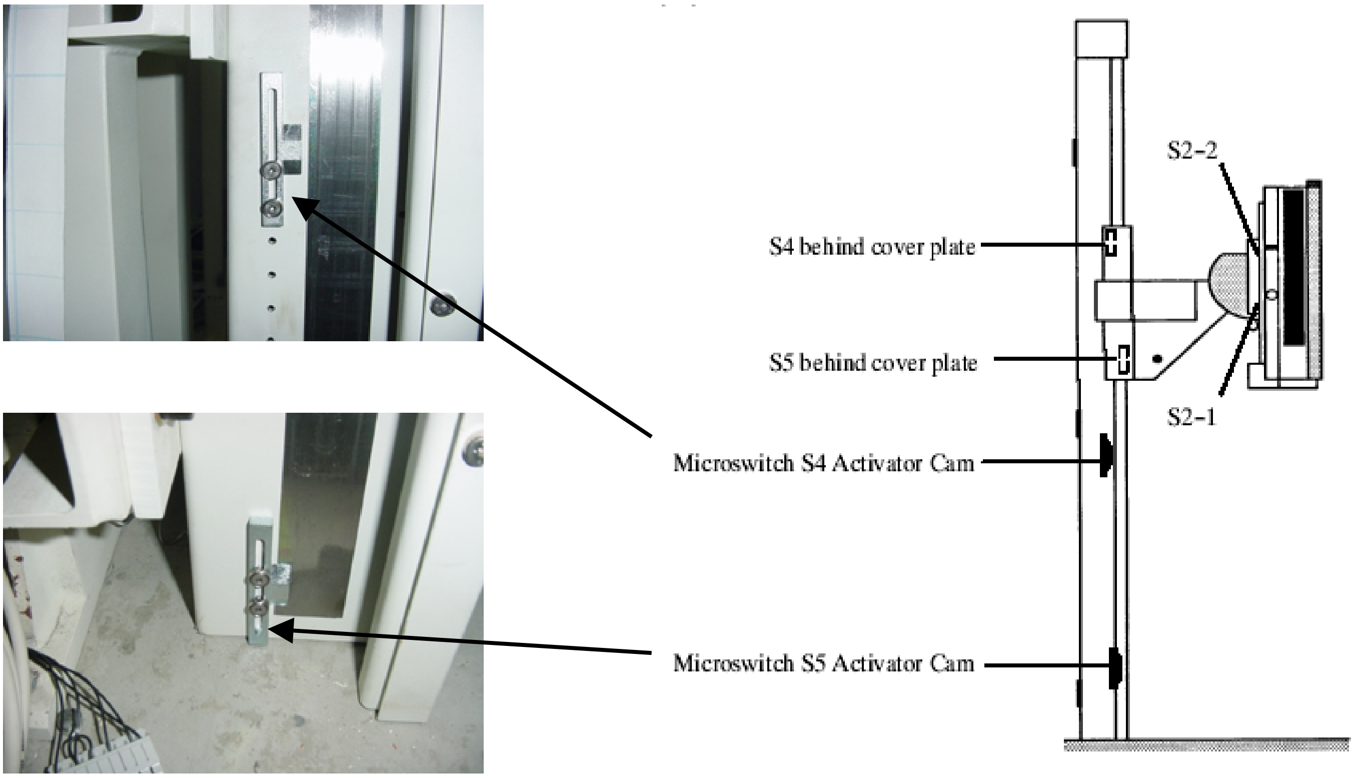
15. Rotate the Bucky to 0°, and angulate it to 90°（horizontal）



16. Modify the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam to decide the distance between the Low Auto Exposure position and the High Auto Exposure position, write down the value of the distance (Distance1). (When the Bucky in horizontal, there are only two positions of Bucky on the column at which the Auto exposure can be made. Of these two positions, the lower one is defined as the “Low Auto Exposure position”, and the higher position is defined as the “High Auto Exposure position”. And these two positions can be modified by adjusting the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam. The default distance between these two positions is 44cm.). (Refer to Job Card IST 008, Chapter2.)

    Check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position. (see parameter 9 “High, low POS. distance”, Job Card CAL 002)

CAUTION **The default value of the distance between Low Auto Exposure position and High Auto Exposure position set in System Console (see parameter 9 “High, low POS. distance”, Job Card CAL 002) is 40cm, which is different from the default distance set on SG100 Wall Stand (44cm). So it’s a must to check and change the parameter value in System Console to ensure it to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position before performing the SG100 SID calibration according to the following steps, even if the positions of the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam are not modified before and be on the default position.**

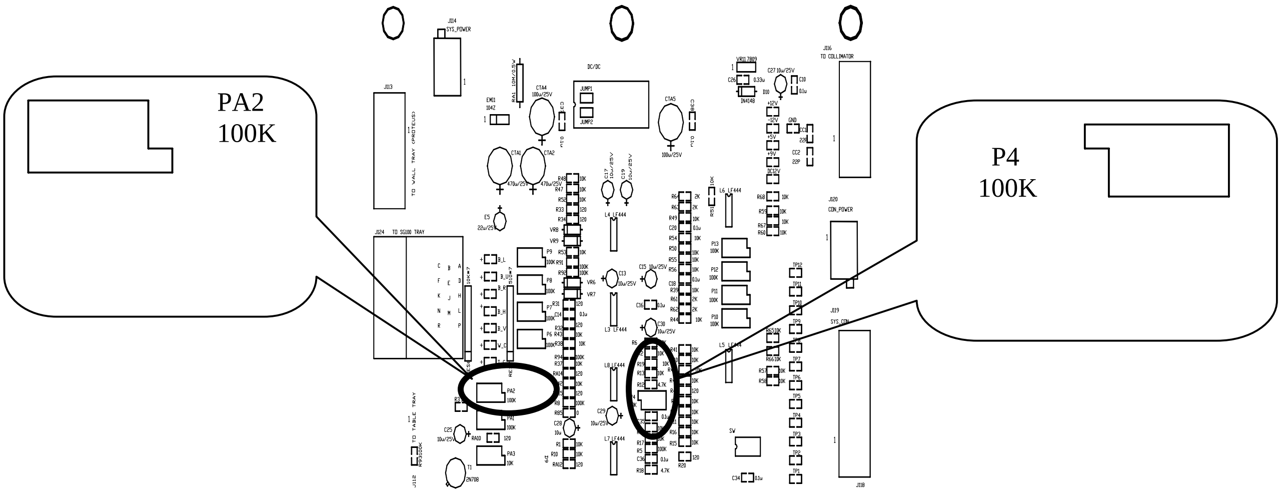


17. Set Wall Stand mode using OTS console or System console. Drive the OTS console, and make it vertically over the Bucky of SG100.

18. Insert a cassette, lower the Bucky to the Low Auto Exposure position, pull out the tray and measure the distance from OTS to the cassette top (actual SID value) using measure tape, then insert the tray all the way into the Bucky and adjust P4 to make the display of SID on the OTS is the same with the actual SID. (If there is no change of SID value displayed on OTS when the Bucky moving up and down with the tray inserted all the way into the Bucky, adjust the P4 to make the SID value displayed on the OTS.)

Note: When the tray is pulled out, it is preset to be no SID display on OTS, not a wrong. To see the SID display on OTS, pay attention to insert the tray all the way into the Bucky after measured the distance from OTS to the tray.

19. Use PA2 for auxiliary adjustment.



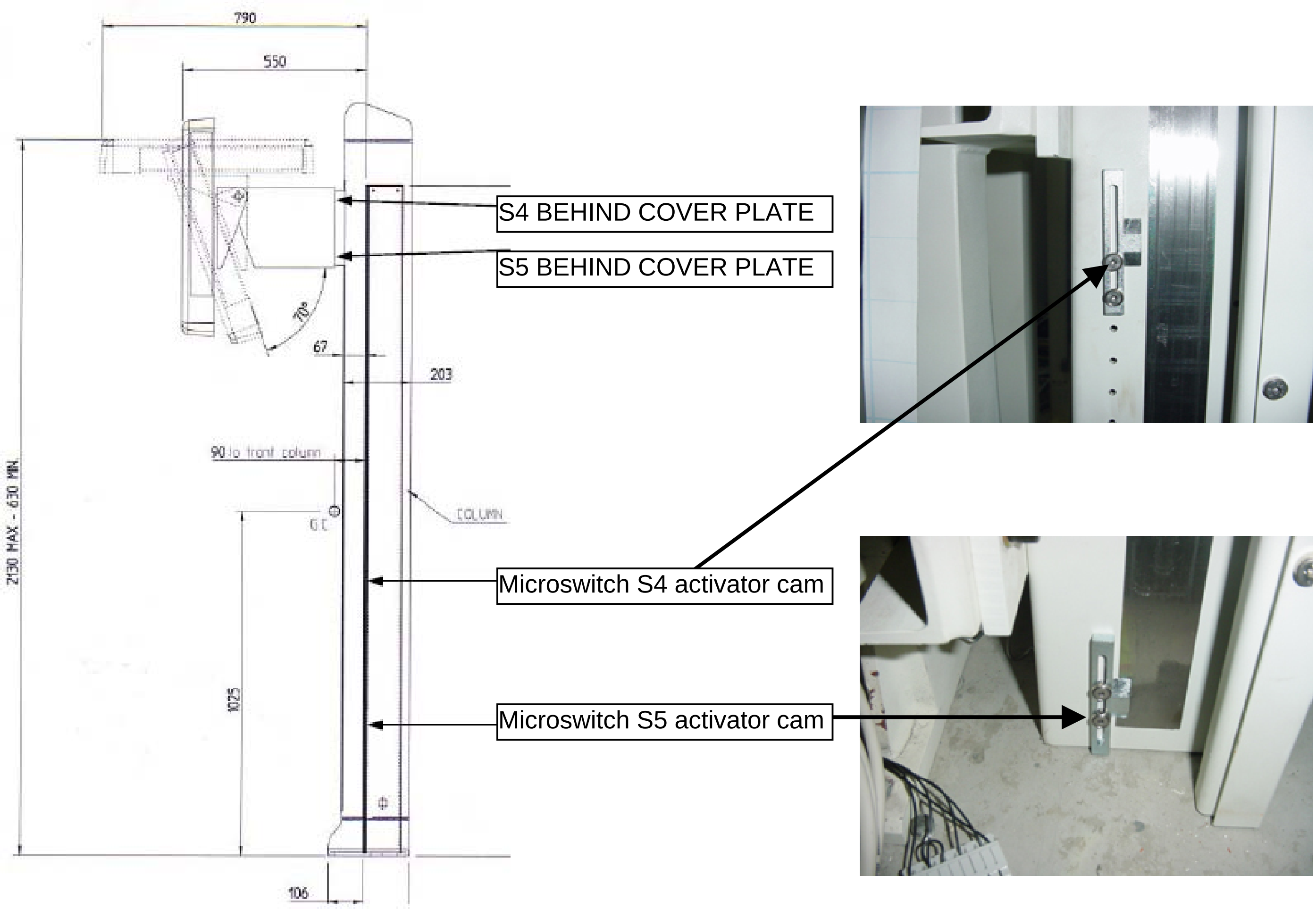
FOR SG120 WALL STAND SID CALIBRATION, CONTINUE WITH FOLLOWING STEPS. IF SG120 IS NOT SELECTED, IT’S ENOUGH TO PERFORM THE STEP 1 TO 14 ONLY FOR SID CALIBRATION.

20. Rotate the Bucky to 0° , and angulate it to 90° （horizontal）

21. Modify the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam to decide the distance between the Low Auto Exposure position and the High Auto Exposure position, write down the value of the distance (Distance1). (When the Bucky in horizontal, there are only two positions of Bucky on the column at which the Auto exposure can be made. Of these two positions, the lower one is defined as the "Low Auto Exposure position", and the higher position is defined as the "High Auto Exposure position". And these two positions can be modified by adjusting the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam. The default distance between these two positions is 44cm.). (Refer to Job Card IST 008, Chapter2.)

    Check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position. (see parameter 9 "High, low POS. distance", Job Card CAL 002)

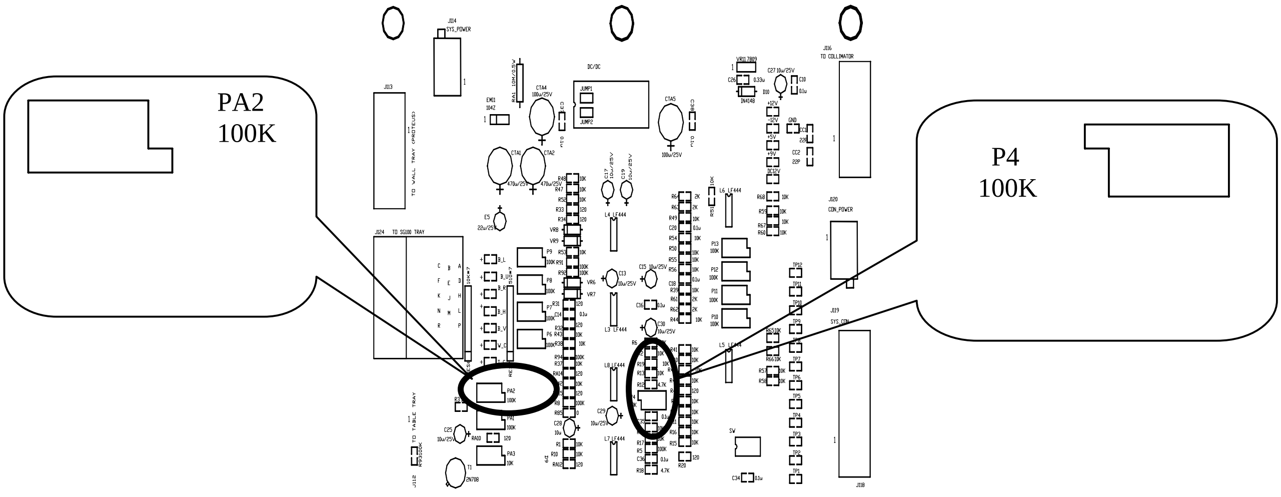
CAUTION **The default value of the distance between Low Auto Exposure position and High Auto Exposure position set in System Console (see parameter 9 "High, low POS. distance", Job Card CAL 002) is 40cm, which is different from the default distance set on SG100 Wall Stand (44cm). So it's a must to check and change the parameter value in System Console to ensure it to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position before performing the SG120 SID calibration according to the following steps, even if the positions of the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam are not modified before and be on the default position.**



22. Set Wall Stand mode using OTS console or System console. Drive the OTS console, and make it vertically over the Bucky of SG120.

23. Insert a cassette, lower the Bucky to the Low Auto Exposure position, pull out the tray and measure the distance from OTS to the cassette top (actual SID value) using measure tape, then insert the tray all the way into the Bucky and adjust P4 to make the display of SID on the OTS is the same with the actual SID. (If there is no change of SID value displayed on OTS when the Bucky moving up and down with the tray inserted all the way into the Bucky, adjust the P4 to make the SID value displayed on the OTS.)

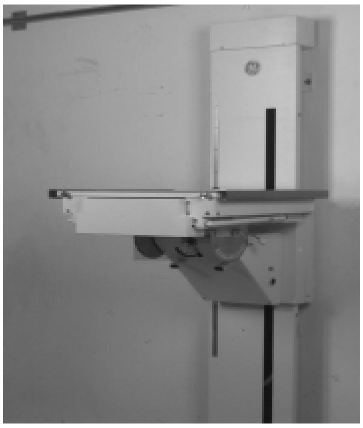
24. Use PA2 for auxiliary adjustment.



Section 2 SID calibration procedure: (For systems with SG100 or SG120 Wall Stand, without Table)

FOR SG100 WALL STAND, FOLLOW STEPS FROM 1 TO 8.
FOR SG120 WALL STAND, FOLLOW STEPS FROM 9 TO 16.

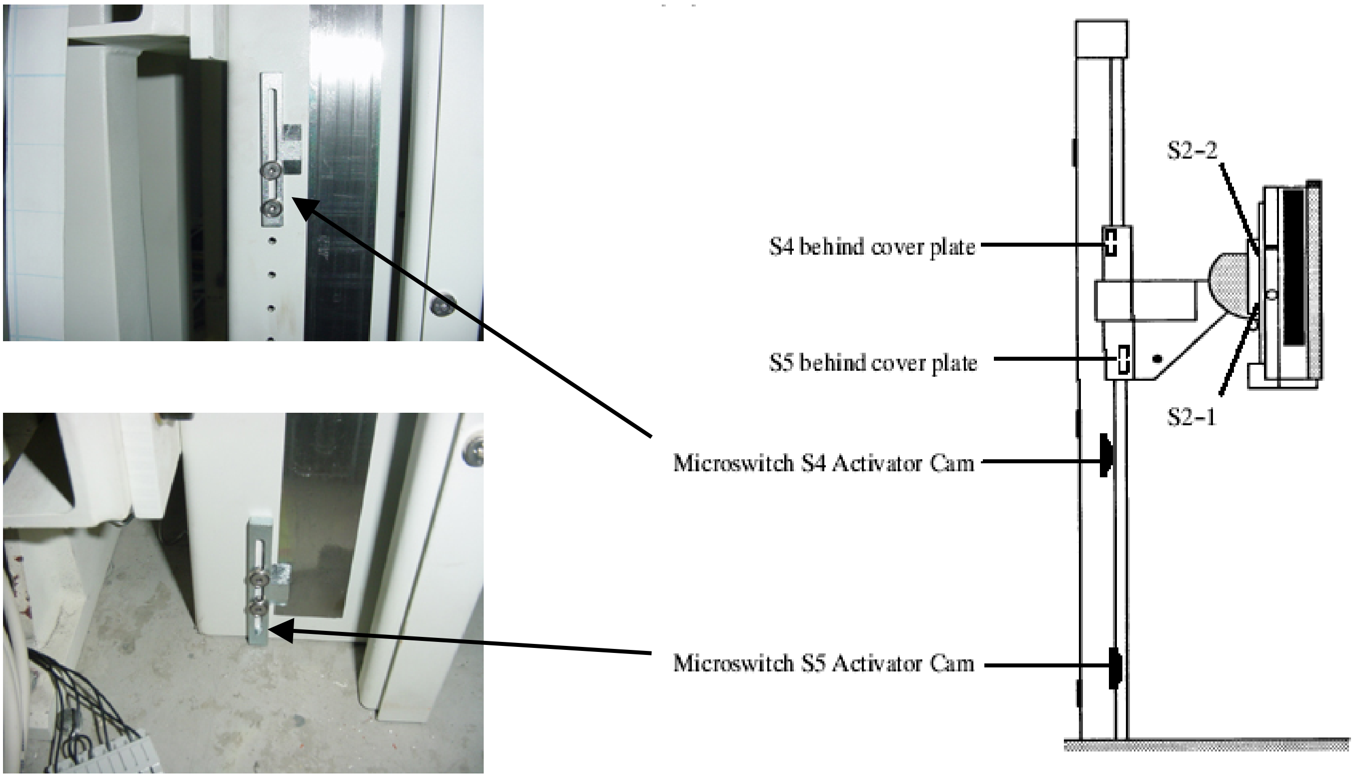
1. Move the SG100 Wall Stand Bucky to the High Auto Exposure position, Rotate the Bucky to 0° and angulate it to 90° （horizontal）.



2. Modify the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam to decide the distance between the Low Auto Exposure position and the High Auto Exposure position, write down the value of the distance (Distance1). (When the Bucky in horizontal, there are only two positions of Bucky on the column at which the Auto exposure can be made. Of these two positions, the lower one is defined as the “Low Auto Exposure position”, and the higher position is defined as the “High Auto Exposure position”. And these two positions can be modified by adjusting the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam. The default distance between these two positions is 44cm.). (Refer to Job Card IST 008, Chapter2.)

   Check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position. (see parameter 9 “High, low POS. distance”, Job Card CAL 002)

CAUTION **The default value of the distance between Low Auto Exposure position and High Auto Exposure position set in System Console (see parameter 9 “High, low POS. distance”, Job Card CAL 002) is 40cm, which is different from the default distance set on SG100 Wall Stand (44cm). So it’s a must to check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position before performing the SG100 SID calibration according to the following steps, even if the positions of the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam are not modified and be on the default position in the upper step.**

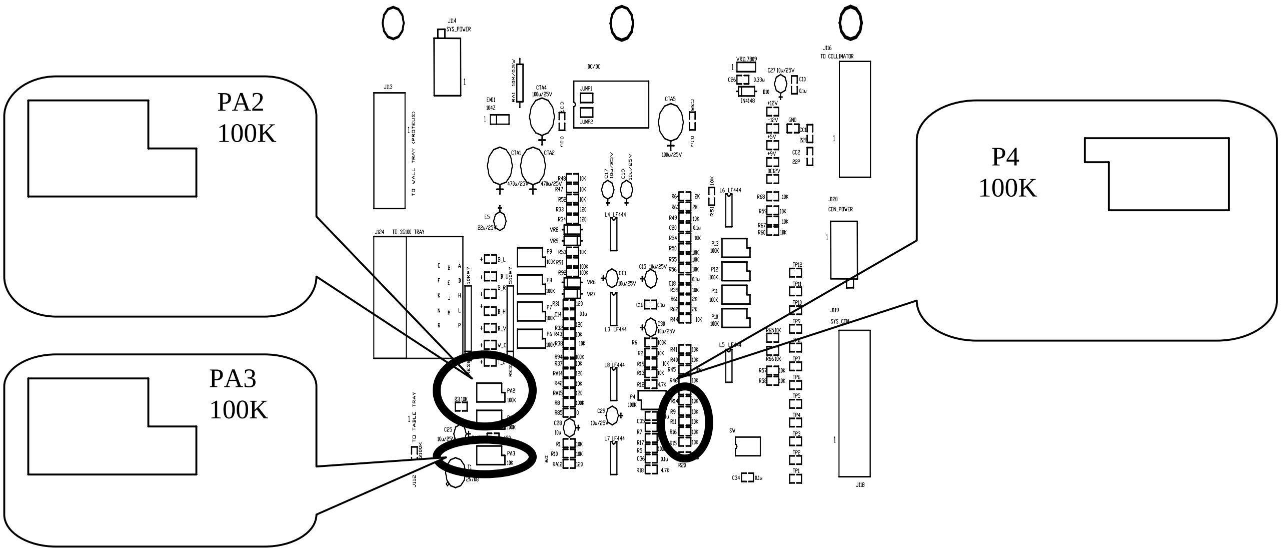


3. Insert the tray with a cassette all the way into the Bucky.
4. Set Wall Stand mode using OTS console or System console. Drive the OTS console, and make it vertically over the Bucky of SG100.

5. Verify the SID display on the OTS console is changing while driving the OTS up and down. Adjust P4 if the SID doesn’t change.
6. Lower the Bucky to the Low Auto Exposure position, drive the OTS to 100cm to the cassette top (pull out the tray and measure the distance from OTS to the cassette top using the measure tape on collimator) and write down the SID value shown on OTS console. Lower the OTS to 70cm to the cassette top (pull out the tray and measure the distance from OTS to the cassette top using the measure tape on collimator). Adjust the PA3 so that the OTS console SID changes 30cm. Repeat step 5 until SID changing is the same as actual moving distance.

Note: When the tray is pulled out, it is preset to be no SID display on OTS, not a wrong. To see the SID display on OTS, pay attention to insert the tray all the way into the Bucky after measured the distance from OTS to the tray.

7. Ensure the Bucky to be on the Low Auto Exposure position, pull out the tray and measure the distance from OTS to the cassette top (actual SID value) using measure tape, then insert the tray all the way into the Bucky and adjust P4 to make the display of SID on the OTS is the same with the actual SID. (If there is no change of SID value displayed on OTS when the Bucky moving up and down with the tray inserted all the way into the Bucky, adjust the P4 to make the SID value displayed on the OTS.)
8. Use PA2 for auxiliary adjustment.



PROTEUS XR/a	**10/12**	**CAL 006**

FOR SG120 WALL STAND, FOLLOW THE STEPS BELOW.

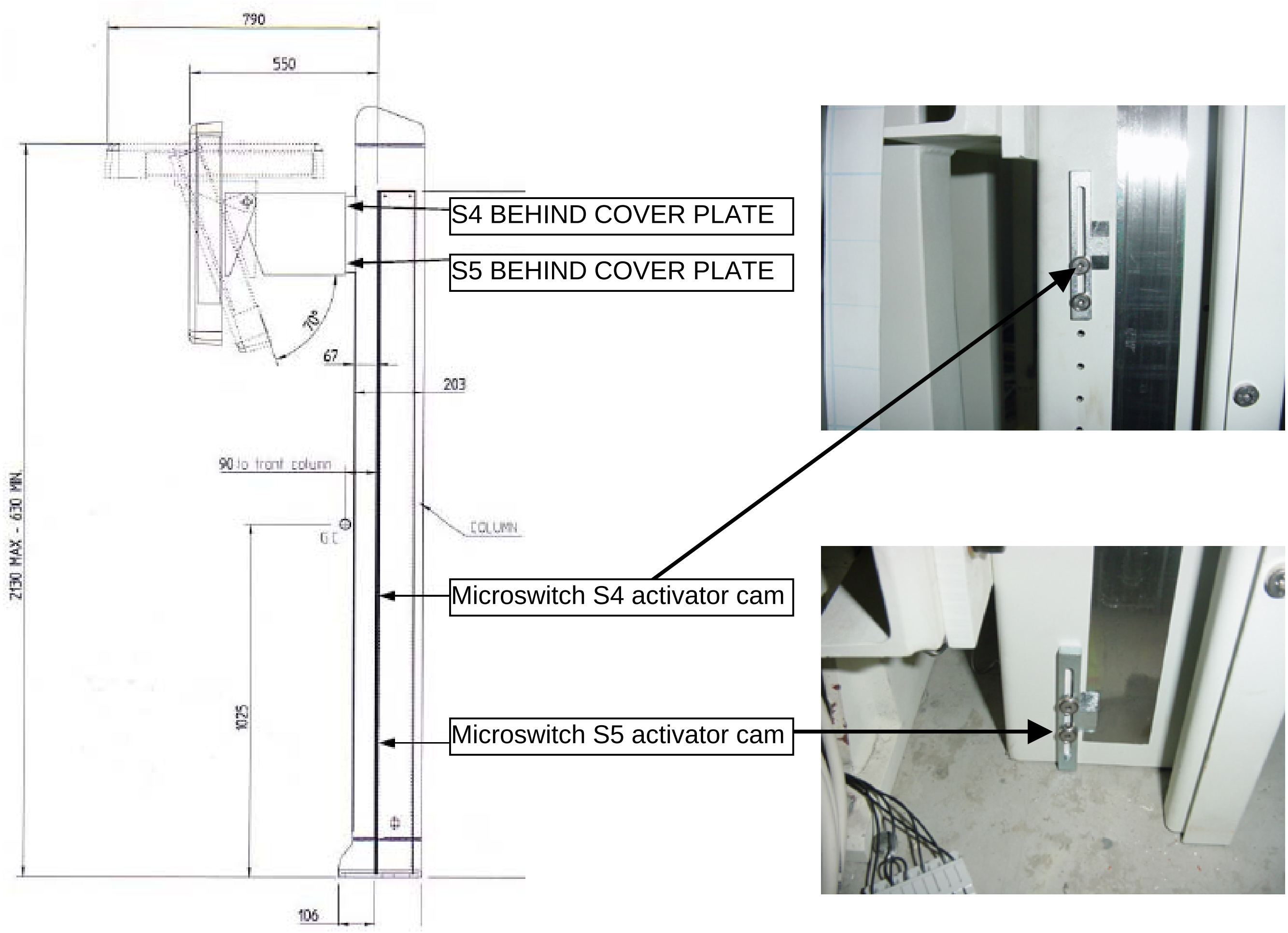
9. Move the SG120 Wall Stand Bucky to the High Auto Exposure position, Rotate the Bucky to 0° and angulate it to 90°（horizontal）.

10. Modify the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam to decide the distance between the Low Auto Exposure position and the High Auto Exposure position, write down the value of the distance (Distance1). (When the Bucky in horizontal, there are only two positions of Bucky on the column at which the Auto exposure can be made. Of these two positions, the lower one is defined as the "Low Auto Exposure position", and the higher position is defined as the "High Auto Exposure position". And these two positions can be modified by adjusting the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam. The default distance between these two positions is 44cm.). (Refer to Job Card IST 008, Chapter2.)

Check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position. (see parameter 9 "High, low POS. distance", Job Card CAL 002)

CAUTION

The default value of the distance between Low Auto Exposure position and High Auto Exposure position set in System Console (see parameter 9 "High, low POS. distance", Job Card CAL 002) is 40cm, which is different from the default distance set on SG100 Wall Stand (44cm). So it's a must to check and ensure the parameter value in System Console to be the same with the actual distance between Low Auto Exposure position and High Auto Exposure position before performing the SG100 SID calibration according to the following steps, even if the positions of the Microswitch S4 Activator Cam and Microswitch S5 Activator Cam are not modified and be on the default position in the upper step.

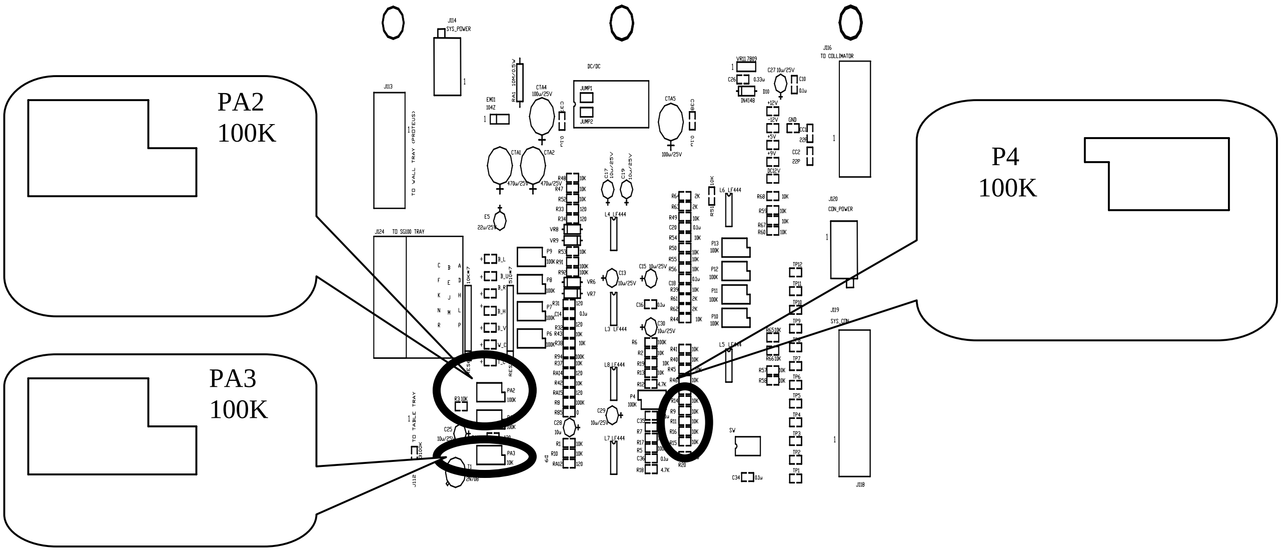

790
550
70°
67
203
90 to front column
COLUMN
GC
2130 MAX - 630 MIN
1025
106
S4 BEHIND COVER PLATE
S5 BEHIND COVER PLATE
Microswitch S4 activator cam
Microswitch S5 activator cam

11. Insert the tray with a cassette all the way into the Bucky.
12. Set Wall Stand mode using OTS console or System console. Drive the OTS console, and make it vertically over the Bucky of SG120.

13. Verify the SID display on the OTS console is changing while driving the OTS up and down. Adjust P4 if the SID doesn't change.
14. Lower the Bucky to the Low Auto Exposure position, drive the OTS to 100cm to the cassette top (pull out the tray and measure the distance from OTS to the cassette top using the measure tape on collimator) and write down the SID value shown on OTS console. Lower the OTS to 70cm to the cassette top (pull out the tray and measure the distance from OTS to the cassette top using the measure tape on collimator). Adjust the PA3 so that the OTS console SID changes 30cm. Repeat step 5 until SID changing is the same as actual moving distance.
15. Ensure the Bucky to be on the Low Auto Exposure position, pull out the tray and measure the distance from OTS to the cassette top (actual SID value) using measure tape, then insert the tray all the way into the Bucky and adjust P4 to make the display of SID on the OTS is the same with the actual SID. (If there is no change of SID value displayed on OTS when the Bucky moving up and down with the tray inserted all the way into the Bucky, adjust the P4 to make the SID value displayed on the OTS.)

PROTEUS XR/a	**12/12**	**CAL 006**

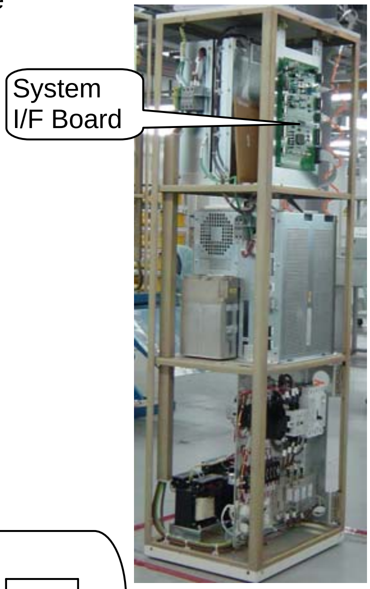
16. Use PA2 for auxiliary adjustment.


PA2
100K
PA3
100K
P4
100K

PROTEUS XR/a			**1/2**	**CAL 007**
subassembly: **Calibrate Cassette Size Display**				
purpose: Calibration and Configuration			*version no*. 1 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **30 min**	

Cassette Size calibration procedure:

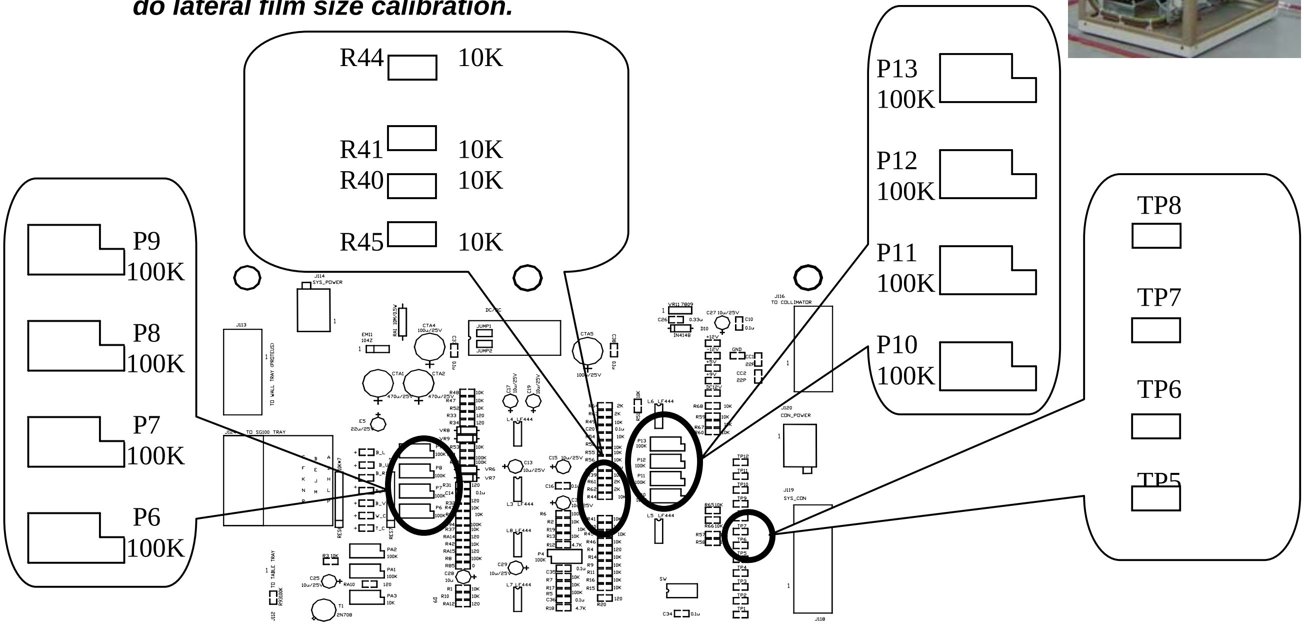
1. Verify the cassette sensing cable is connected correctly;
2. Verify the system communication is working and the SID display is working well;
3. Set the film size expanding to 0%. Refer to Job Card CAL 002 in page 4-4.
4. Switch the collimator mode to Auto Mode;
5. Select table bucky receptor or wall bucky receptor depending on which cassette tray is calibrating;
6. Open the front cabinet cover by loosening the two screws underneath the cover.
7. Measure the Volt between TP5 and GND. Adjust P6 to make the Volt being –0.84±0.01V.
8. Measure the Volt between TP6 and GND. Adjust P7 to make the Volt being –0.84±0.01V.
9. Insert a 14inch(356mm) x 14inch(356mm) cassette into table bucky.



Note: ***Make sure the cassette is placed in correct position.***

10. For calibrating longitudinal film size, adjust P10 to make Volt between TP7 and GND being 3.33±0.01V.
11. For calibrating lateral film size, adjust P11 to make Volt between TP8 and GND being 3.33±0.01V.

Note: ***If there is only 14inch(356mm) x 17inch(432mm) cassette, use 14inch(356mm) side to do longitudinal film size calibration. Then turn the cassette around and use14inch (356mm) side to do lateral film size calibration.***



PROTEUS XR/a	**2/2**	**CAL 007**

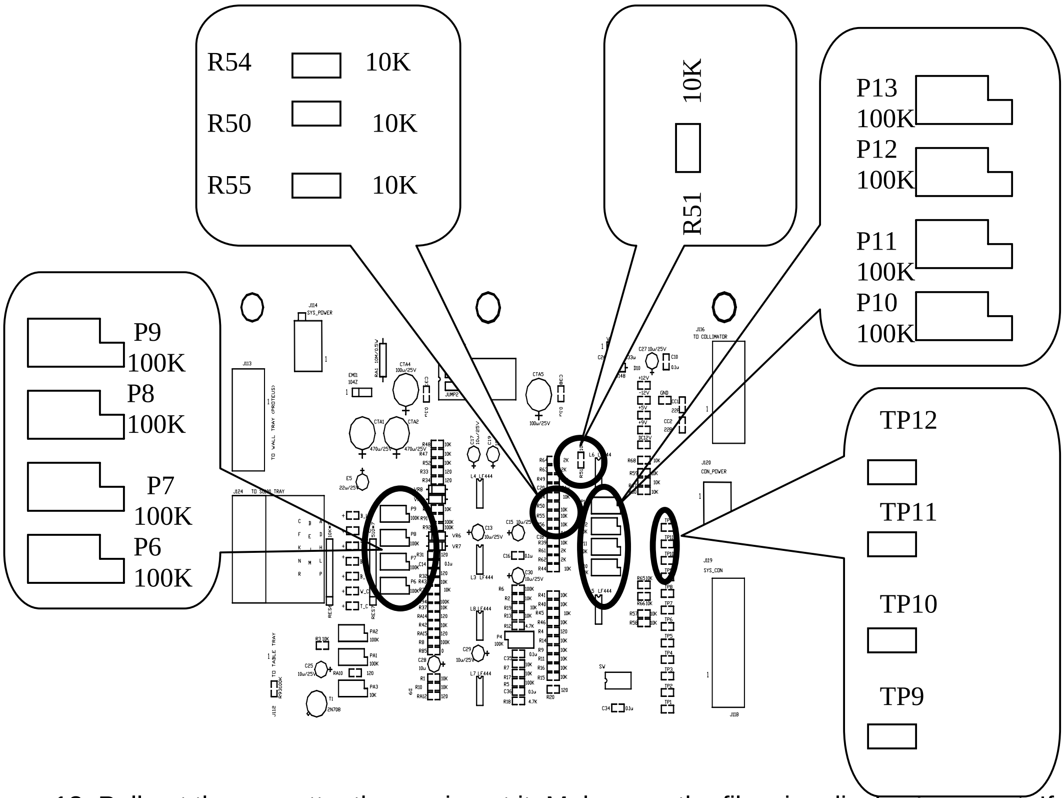
12. Pull out the cassette, then re-insert it. Make sure the film size display is correct. If not, redo step 10 and 11. Adjust the Volt slightly, then try it again.
    Try other size cassettes. If the film size displayed is not correct, redo step 10 and 11. Adjust the Volt slightly, then try other cassettes.
13. Measure the Volt between TP9 and GND. Adjust P8 to make the Volt being –0.84V±0.01V.
14. Measure the Volt between TP10 and GND. Adjust P9 to make the Volt being –0.84V±0.01V.

Note: ***Make sure the cassette is placed in correct position.***

Note: ***The following steps also suitable to SG 100 Wall Stand.***

15. Insert a 14inch(356mm) x 14inch(356mm) cassette into wall bucky.
16. For calibrating longitudinal film size, adjust P12 to make Volt between TP11 and GND being 3.33±0.01V.
17. For calibrating lateral film size, adjust P13 to make Volt between TP12 and GND being 3.33±0.01V.

Note: ***If there is only 14inch(356mm) x 17inch(432mm) cassette, use 14inch(356mm) side to do longitudinal film size calibration. Then turn the cassette around and use14inch (356mm) side to do lateral film size calibration.***



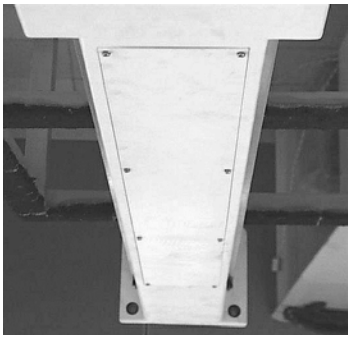
18. Pull out the cassette, then re-insert it. Make sure the film size display is correct. If not, redo step 16 and 17. Adjust the Volt slightly, then try it again.
    Try other size cassettes. If the film size displayed is not correct, redo step 16 and 17. Adjust the Volt slightly, then try other cassettes.

PROTEUS XR/a			**1/3**	**CAL 008**
subassembly: **Wall Stand (GPCP No. 600-0301), SG100 Wall Stand (GPCP No. 2225849), and SG120 Wall Stand (GPCP No. 2402562)**				
purpose: Calibration and Configuration			*version no*. 1 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **20 min**	

Wall Stand counterweight has been calibrated at factory. The following procedure is provided in case re-calibration is needed.

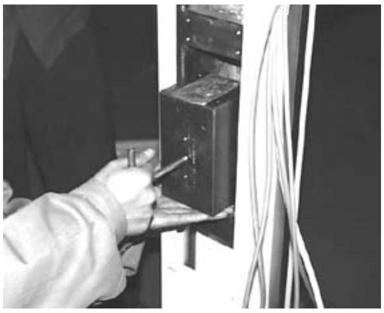
Counterweight Calibration Procedure:

1. Open the back cover of the wall stand.



2. Open the back cover of the counterweight container.
3. Hold the counterweight container firmly and Insert the provided counterweight.
   *Pull out the counterweight container with a provided puller, then change the counterweight in the container

Note: The content with a star is only for the wall stand with a knee spacer.*



4. Check the bucky up and down motion is smooth and operating force is less than 5kg when inserting a 14”x17” cassette.
5. Mount the counterweight container cover and wall stand cover, fasten all screws.

WARNING

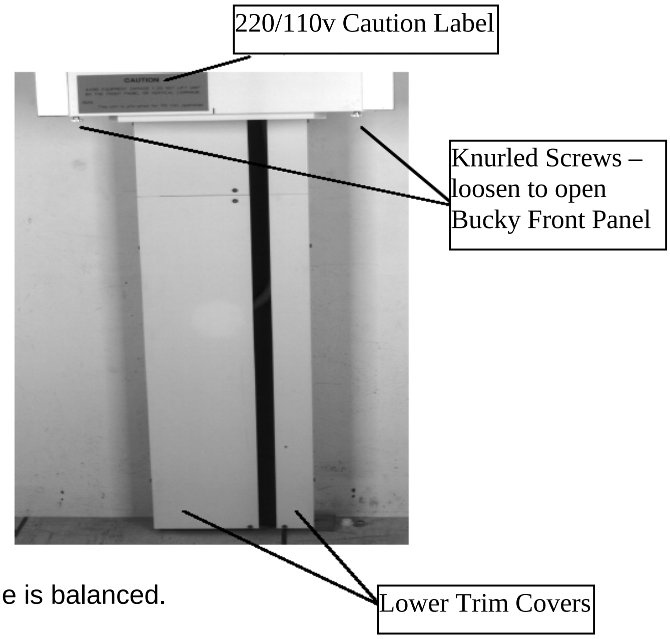
Keep the film cabinet and counterweight pieces under control, while you are taking the calibration procedure. Any unexpected movement may result in body hurts.

PROTEUS XR/a	**2/3**	**CAL 008**

Counterweight Calibration Procedure For SG100 Wall Stand:

Note: The information in this page is concerted with the revision 6 of SG 100 Wall Stand Service Manual (GPCP Number 2150297-100). For the reason of the updates and changes in that manual, it is recommended to see also the latest Service Manual of SG 100 Wall Stand for reference.

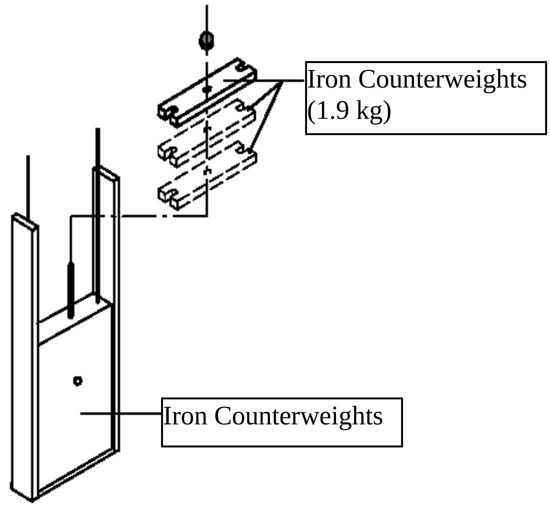
1. Raise the Bucky assembly to its top position.
2. Remove the two lower trim covers (3) screws.
3. Remove the lower (charcoal grey) counterweight cover (6 screws).


220/110v Caution Label
Knurled Screws – loosen to open Bucky Front Panel
Lower Trim Covers

4. Add or remove counterweights until the Bucky carriage is balanced.

Note: Extra counterweights are furnished as part of the Ion Chamber option.

5. Raise the Bucky assembly to 63” (1.6 m) from the floor to enable installation of the lower charcoal grey cover and the lower trim covers.
6. Replace the charcoal grey cover and ensure that the Bucky harness is outside the cover.
7. Reinstall lower trim covers.


Iron Counterweights (1.9 kg)
Iron Counterweights

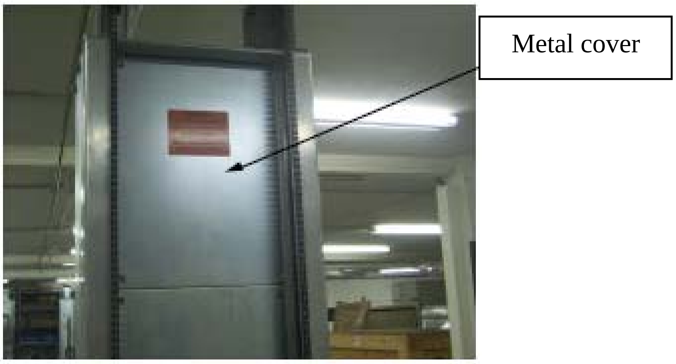
PROTEUS XR/a	3/3	CAL 008

Counterweight Calibration Procedure For SG120 Wall Stand:

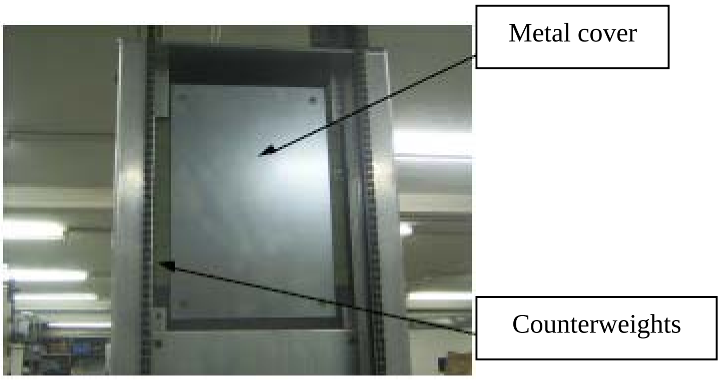
WARNING **DURING THIS OPERATION, THE BUCKY CARRIAGE AND COUNTERWEIGHT CARRIAGE CAN MOVE.**

1) Move the carriage to the lowest position.

2) Remove the metal cover on the front of the column.



3) Remove the second metal cover to access the counterweights.



4) Place or remove the counterweights with care.

5) Reinstall the two sheet metal covers and the column lateral covers.

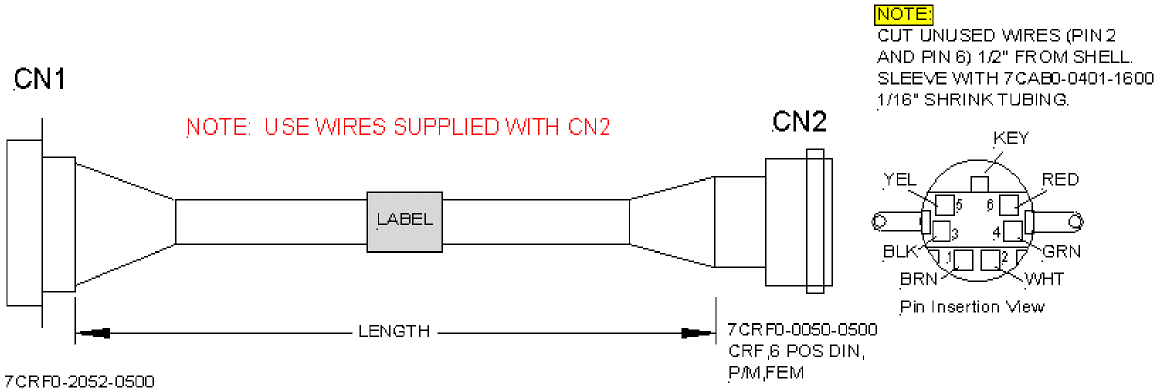
PROTEUS XR/a		**1/2**	**CAL 009**
subassembly: **Touch Screen Calibration**			
purpose: Calibration and Configuration			*version no.* 0 *date:* **14/08/01**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* **30 min**

Touch Screen calibration has been performed at the factory. The following procedure is provided in case the touch screen needs to be recalibarated.

1. Tools

- Proteus System Software Disk
- A PS2 type of computer keyboard
- A communication cable

Note: All systems are shipped with a keyboard cable. If the cable is missing, FE should make a communication cable according to illustration.


NOTE:
CUT UNUSED WIRES (PIN 2 AND PIN 6) 1/2" FROM SHELL. SLEEVE WITH 7CAB0-0401-1600 1/16" SHRINK TUBING.
CN1
NOTE: USE WIRES SUPPLIED WITH CN2
CN2
LABEL
LENGTH
KEY
YEL
RED
BLK
GRN
BRN
WHT
5
6
3
4
1
2
Pin Insertion View
7CRF0-0050-0500
CRF,6 POS DIN,
P/M,FEM

7CRF0-2052-0500
CRF,DB15,TIN,
CRIMP SHELL,
STD MNT

7CRF0-0025-0200
CRF,DB25,CONTAC,
FEM,CRF-2501

CN1	COLOR	CN2
1		
2		
3		
4		
5		
6		
7	BLK	3
8	YEL	5
9		
10		
11		
12		
13		
14	GRN	4
15	BRN	1

JUMPERS
1 - 4
1 - 9
1 - 12
2 - 3
10 - 11

NOTE:
USE 7CAB0-0085-5000
28GA,STR,WHITE WIRE
FOR JUMPERS

2. Procedure

1. Power off.
2. Demount the printer if have.
3. Use the communication cable connecting the keyboard and the console connector CN1.
4. Insert the system software disk into the console.
5. Power on.
6. At the c:/ prompt type “Tbdriver.exe”
7. Type “Tbcal.exe”; enter the main menu of Touch Screen Calibration Program.

PROTEUS XR/a	2/2	CAL 007

8. Press “H” (Hard Calibrate).
9. Touch the extreme bottom left corner and right corner, and then press any key to return main menu.
10. Press “6” (640X480 graphics).
11. Touch the centre of the crosses twice then press any key to return main menu.
12. Press”7” (Test menu) then press”6”.
13. Touch the screen, there should be an “x” under the touch area. If “x” is away from the touch area, should check the system console.
14. Press ”x” to exit the calibration program.
15. Power off and mount the printer.

PROTEUS XR/a		**1/1**	**CAL 010**
subassembly: **HHS Test Calibration**			
purpose: Calibration and Configuration			*version no*. 1 *date:* **20/12/99**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* **30 min**

Installers must indicate that the combination of installed HHS Certified Components is compatible on Form F3382 provided in Direction 46-013894, *System Field-Test For HHS*.

Proteus XR/a System HHS Compliance Compatibility List

PRODUCT CATEGORY	PRODUCT DESCRIPTION	MODEL NUMBER
X-RAY CONTROL	SYSTEM CONSOLE	2259976
	PROTEUS XR/a SYSTEM CABINET/ GEN. & PDU	2259937
X-RAY TUBE ASSEMBLY HOUSING (CASING)	RAD 14	2259981
	RAD 21	2271627
	MX 100	D2301R
BEAM LIMITING DEVICE	PROTEUS XR/A AUTO COLLIMATOR	2259298-54
	ECLIPSE PROTEUS COLLIMATOR	2379827
CASSETTE TRAY	CASSETTE TRAY	2176788
NON-CERTIFIED DEVICE	OTS CONSOLE	2259974

PROTEUS XR/a			**1/8**	**SW JEDI 7-4**
subassembly: **SERVICE SOFTWARE USER GUIDE**				
purpose:			*version no*. 1 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 15*** **min**	

1 SUPPLIES

None.

2 TOOLS

- Service laptop with floppy drive
- Service tools
  - JEDI service software
  - 9-wire serial cable

3 SAFETY PRECAUTIONS

Not applicable.

4 PREREQUISITES

Basic knowledge of PC based computer laptop, DOS and usage of Microsoft WINDOWS.

PROTEUS XR/a	2/8	SW JEDI 7-4

5 PROCEDURE

5-1 Loading Service Software on Service Laptop

The service software can be used either from the calibration diskette or from the Hard Disk Drive. We recommend to launch it from the Hard Disk Drive for speed performance.

It can operate under DOS or Windows 95; but **for software download or database backup, it is required to run asian.exe under DOS to avoid communication problem** (with the mouse, click on START, SHUTDOWN, RESTART COMPUTER UNDER DOS MODE; see page 4-40 ”Software Download / Upgrade” Job Card).

- Power ON Service laptop. Under Windows, run the File Manager (Explore)
- Create a specific directory (e.g.: JEDI) under C:\
- Insert into the floppy drive the ”Service Software” floppy delivered with the equipment in the Service Tool set.
- Copy the file **SPX_X.EXE** from the floppy disk to that directory

(Double click on A:\, drag and drop on C:\ JEDI or whatever name of your directory)

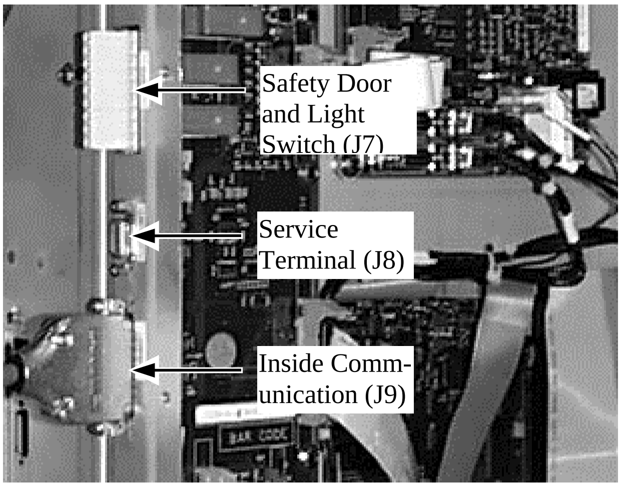
5-2 Unzip software file

The floppy drive supplied with the equipment (or the upgrade kit) contains “Auto-zipped” files.

It is necessary to load those files on the hard disk drive and run them; they will unzip and create other files that you will use.

- Double click on the **SPX_X.EXE** file, and verify that the new files are created:

appl.mx , boot.mx, asian.exe ,Asiane.msg and data base files.mx



5-3 Using Service Software

Connect Service laptop as follows:

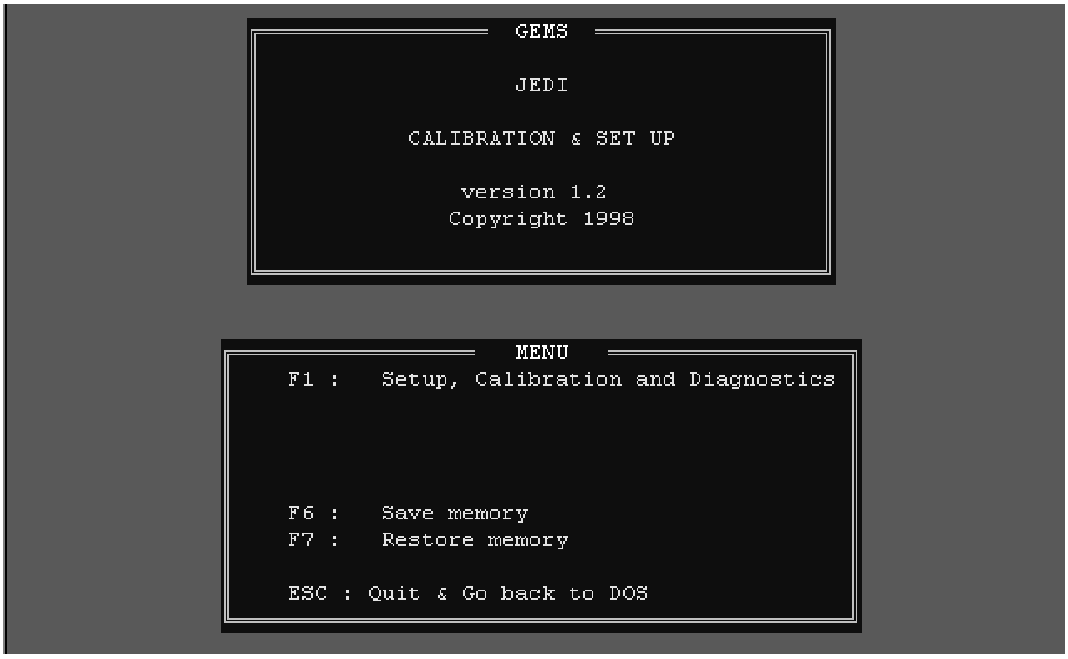
- Use the 9 pin Serial cable, part No 2207478, to connect serial line of Service laptop to connector XJ8 on the I/F board.
- Switch on the Service laptop.
- To run the program:

  Under Windows:
  - double click on “asian.exe”

  Under DOS:
  - select Disk Drive from where you want to run the program: C: [enter] or A: [enter]
  - enter the directory where “asian.exe” stays in.
  - key in : “asian” [enter]

PROTEUS XR/a	3/8	SW JEDI 7-4

The following screen appears:

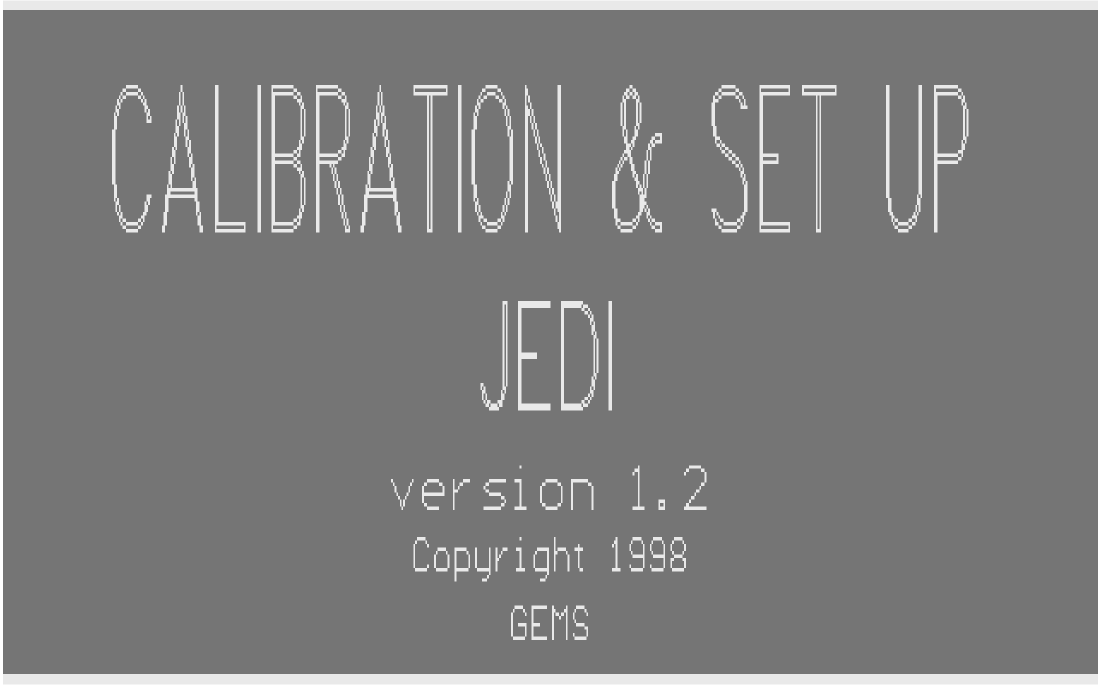


```
GEMS

JEDI

CALIBRATION & SET UP

version 1.2
Copyright 1998
```

```
MENU
F1 :   Setup, Calibration and Diagnostics



F6 :   Save memory
F7 :   Restore memory

ESC : Quit & Go back to DOS
```

- Power ON the generator
- Press function key F1

The following example screen appears:



CALIBRATION & SET UP

JEDI

version 1.2

Copyright 1998

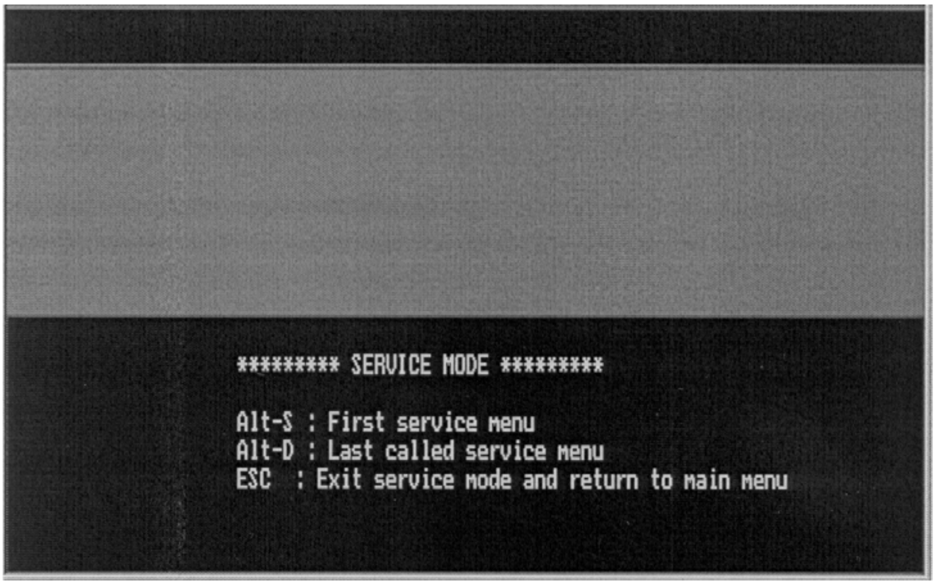
GEMS

The software will load the help screen information contained in Asiane .msg file.

PROTEUS XR/a	**4/8**	**SW JEDI 7-4**

- Wait or press space bar to jump to screen.

This screen will appear:



```
********* SERVICE MODE *********

Alt-S : First service menu
Alt-D : Last called service menu
ESC  : Exit service mode and return to main menu
```

5-4 Selecting Maintenance and Application Mode; major keys

FROM	PROCEDURE	TO
APPLICATION MODE	Type **<ALT> - <S>** (Together)	SETUP/MAINTENANCE MODE MENU 3
APPLICATION MODE	Type **<ALT> - <D>** (Together)	SETUP/MAINTENANCE MODE LAST MENU OR SUB-MENU selected.
SETUP/MAINTENANCE MODE	From any menu, type **<R>** (several types if necessary) or **<Q>**	APPLICATION MODE

[Q]	Return to application mode
[R]	Return to a higher level menu
[W]	Validate
[ALT] & [S] (Together)	Calibration mode (Menu 3)
[ALT] & [D]	Calibration mode (Last menu called)
[→] and [←]	In maintenance mode, to move through menus
[F1] to [F0]	Function keys with action based on context.
Other keys	Based on context. Main function recalled in the screen and also in Job Cards wherever used.
<ESC>	Escape Service Menu ***Note: It may cause JEDI communication problem to directly use ESC key to quit Service mode.***

5-5 Service Menu breakdown tree

- Type [ALT] & [S] (Together) to go to Maintenance Menus (MENU 3)
- Type [→] and [←] keys to select a menu.
- Illustration 1 shows the relationship between the Maintenance Mode menus and the function keys used to access those menus.
- To return to a higher level, key in [**R**]

The darkened menus are the ones used for Generator and room setup (Configuration and Calibration):
menu 3, 4, 5.

Menu 3 is used to Configure the system

Menu 4 is used to calibrate AEC mode (Automatic Exposure Control)

Menu 5 is used to perform Checksum

Menu 1 is used to perform generator test and diagnostics.

Menu 2 is used to enter Date and Time, visualize/clear error log, and visualize/clear tube and generator recorded tracking Data.

PROTEUS XR/a	6/8	SW JEDI 7-4

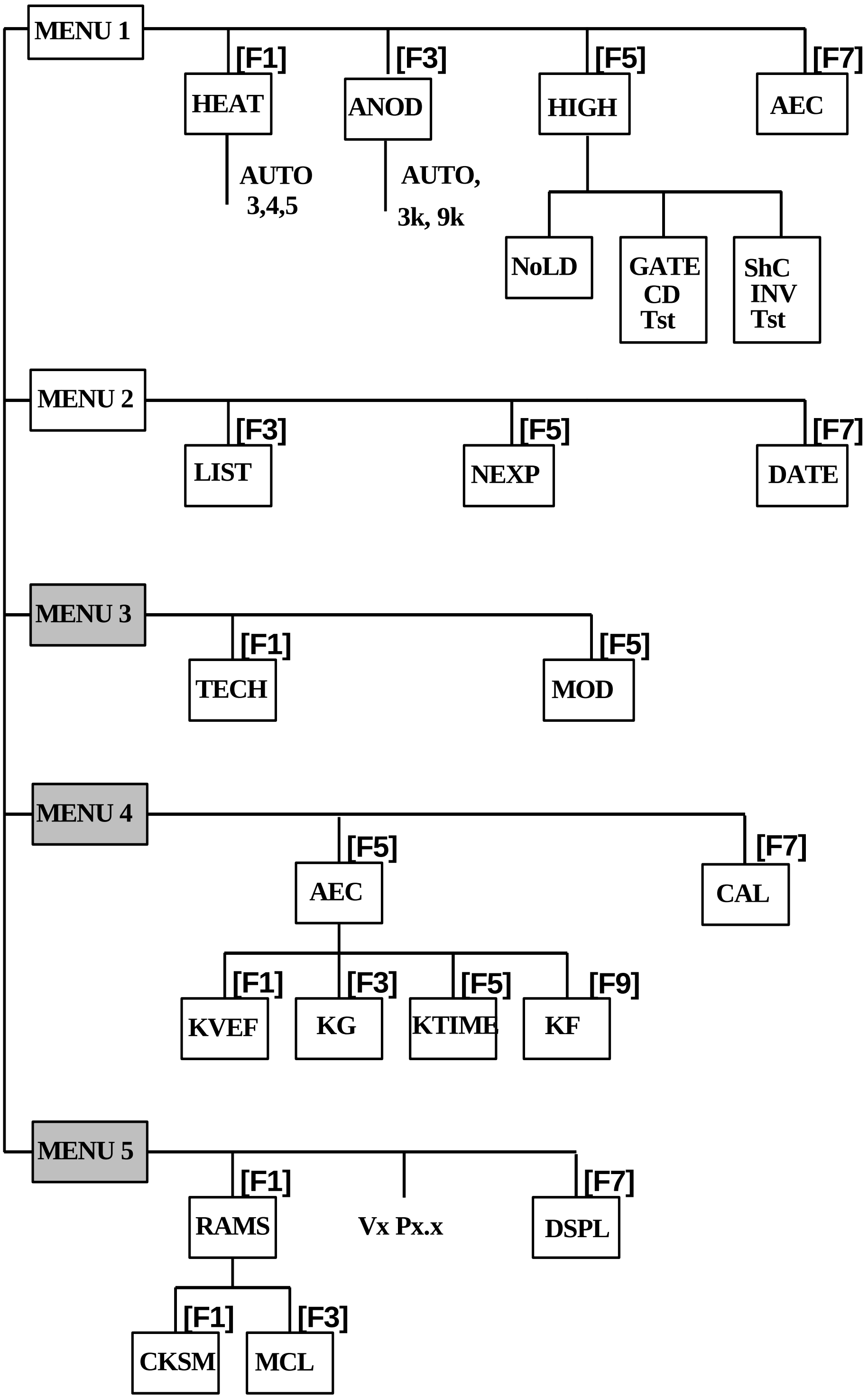

MENU 1
[F1]
HEAT
AUTO
3,4,5
[F3]
ANOD
AUTO,
3k, 9k
[F5]
HIGH
NoLD
GATE CD Tst
ShC INV Tst
[F7]
AEC
MENU 2
[F3]
LIST
[F5]
NEXP
[F7]
DATE
MENU 3
[F1]
TECH
[F5]
MOD
MENU 4
[F5]
AEC
[F1]
KVEF
[F3]
KG
[F5]
KTIME
[F9]
KF
[F7]
CAL
MENU 5
[F1]
RAMS
[F1]
CKSM
[F3]
MCL
Vx Px.x
[F7]
DSPL

Illustration 1 - Service menu Breakdown tree

5-6 Sub-Menu summary description

1. Configuration - MENU3

   TECH: programming workstation, technique parameters.

   MODE: Select Renard or Normal scale for kV selection.

   (See Page 4-52 “Workstation Parameter” Job Card).

2. Calibration - MENU4

   AEC: To set parameters if known, or modify them manually.

   CAL: To calibrate Automatic Exposure Control, for each AEC chamber and Screen-film combination.

   (See page 4-60 Job Card “Automated AEC calibration”)

3. Ram - MENU5

   RAMS: NVRAm operation & display:

   - **CKSM**: To update Checksum after configuration, calibration, parameter change. (See page 4-83, Job Card “Checksum Validation”)

   - **MCLR**: Clear NVRam memory. Normally not to be used, unless specifically instructed. (Do not use if Data Base backup has not been performed previously)

   Vx Px.x: Display generator software version (e.g. P3.4)

   DSPL: In Maintenance Mode, to display parameter after exposure using key [Z]

4. Utilities - MENU2

   LIST: To display last recorded error codes (up to 64)

   - Last error is visualized with Date and Time
   - Function keys allow to scroll down and up
   - [Z] to get back to the last recorded error
   - Same consecutive error are counted Up in the same line
   - [^H], and [W] to clear error log

   NEXP: To visualize/clear tube and generator recorded tracking Data. Clear must be performed only when replacing X-Ray tube. Meaning of each parameter is found in page 4-44, ”Tube Replacement Software Procedure” Job Card.

   DATE: To enter / modify the date and time.

PROTEUS XR/a	8/8	SW JEDI 7-4

5. Diagnostics - MENU1

HEAT: To exercise Heater/filament function.

- **Auto**: run fixed current on both filament (if 2 filaments) in sequence on selected tube (If more than 1).

- **L or S**: run 3, 4, or 5 Amps on Large or Small Focus.

ANOD: To exercise Rotor function.

- **Auto**: run rotation cycle in Low Speed then High Speed (If allowed by configuration) on selected tube. (If more than 1)

- **3k**: run one cycle acceleration, hold, break in Low Speed on selected tube (If more than 1)

- **9k**: run one cycle acceleration, hold, break in High Speed (If allowed by configuration) on selected tube (If more than 1)

HIGH: To exercise High Voltage function.

- **NoLD**: To troubleshoot HV problem, without mA nor rotation without X-Ray tube nor HV cable. Test is run from 80 to max. kV, adjustable from 1 to 60 sec.

- **Gate CD Test**: to verify operation of the gate command board on the Inverter. Test is run during 10 sec. At 0 kV.

Note: ***Requires manual set up. Read related information in diagnostics section.***

- **ShC INV Tst**: To verify operation of inverter with inverter in short circuit. Test is run during 100 msec. At 0 kV.

Note: ***Requires manual set up. Read related information in diagnostics section.***

AEC: To verify operation of AEC board. Refer to diagnostics section.

PROTEUS XR/a			**1/4**	**SW JEDI 7-2**
subassembly: **Software Download / Upgrade**				
purpose: **This Jobcard is needed only when FE replace new generator , KV control board or X-ray tube.**			*version no*. 1 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***1h 15*** **min**	

1 SUPPLIES

None.

2 TOOLS

- Service Laptop with floppy drive.
- Service tools
  - JEDI Service Software
  - 9-wire serial cable Part No. 2207478.

3 SAFETY PRECAUTIONS

Not applicable.

4 PREREQUISITES

Basic knowledge of PC based computer laptop, DOS and usage of Microsoft WINDOWS.
Database backup must have been performed.

5 PROCEDURE

5-1 Load Software File on Service Laptop

The service software can be used either from the calibration diskette or from the laptop hard disk drive. We recommend launching it from the Hard Disk Drive for speed performance. It can operate under DOS, Windows 95 or Windows 3.1.

If you do not have it on the laptop, refer to page 4-32, “Service Software User Guide” Job Card.

- Power ON service laptop

  Under Windows, run the File Manager (Explore)
- Create a specific directory (e.g.: JEDI) under C:\
- Insert into the floppy drive the floppy delivered with the equipment in the service tool set (or with the upgrade)
- Copy the FILE “**SPX_X.EXE**” from the floppy disk to that directory

  (Double click on A:\, drag and drop on C:\ JEDI or whatever name of your directory)

5-2 Unzip software file

The floppy drive supplied with the equipment (or the upgrade kit) contains “Auto-zipped” files.

It is necessary to load those files on the hard disk drive and run them; they will unzip and create other files that you will use.

- Double click on the **SPX_X.EXE** file, and verify that the new files are created. (appl.mx and boot.mx)

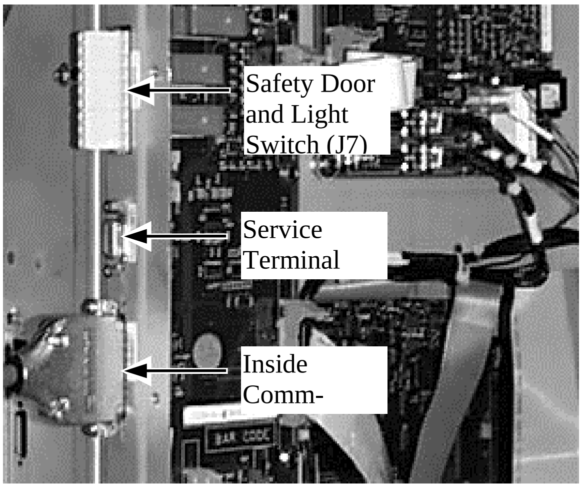
5-3 Software download

1. Power off system.

   Unplug the cable from system I/F board Connector J118.

   Connect Service laptop as follows:

   Use the 9-wire serial cable, part N. 2207478, to connect serial line of service laptop to connector XJ8 on the I/F board.



2. Restart the computer in DOS mode (for software download or database backup, it is required to run asian.exe under DOS to avoid communication problem).

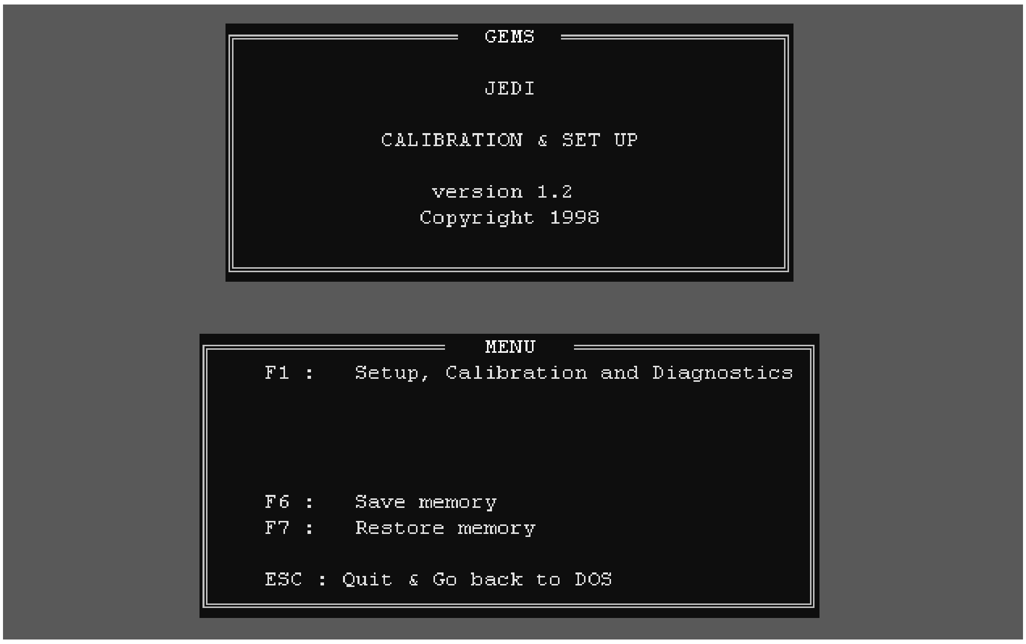
   With the mouse, click on START, SHUTDOWN, RESTART COMPUTER UNDER DOS MODE.
3. Run the program:

   Under DOS: -select Disk drive from where you want to run the program: C: [enter] or A: [enter]

   -enter the directory where “asian.exe” stays in.

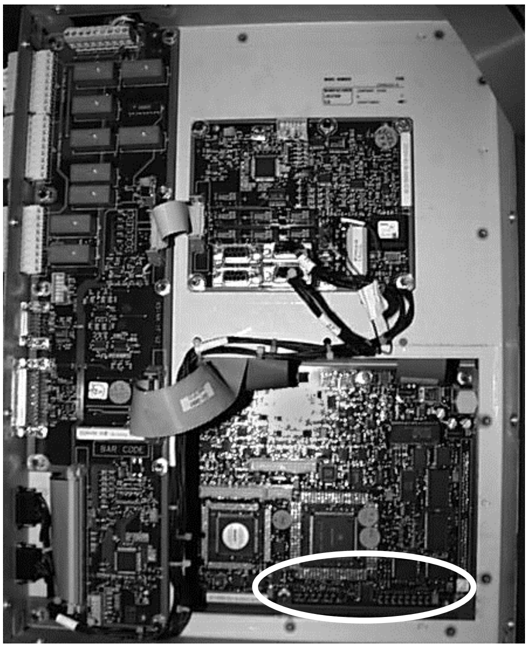
   -key in : “asian” [enter]

The following screen appears:



```
GEMS

JEDI

CALIBRATION & SET UP

version 1.2
Copyright 1998
```

```
MENU
F1 :   Setup, Calibration and Diagnostics



F6 :   Save memory
F7 :   Restore memory

ESC : Quit & Go back to DOS
```



7. From the laptop software mainscreen, type “F7 : restore memory”

8. Type “appl.mx”, then enter (or C:\JEDI\appl.mx)

Note: If the system is equipped with a Rad21 tube with tube fan, type”F80ra21f.mx” or “F65ra21f.mx”then enter. Please refer to R21 Tube Fan Installation Manual (2301864).

If the system is equipped with a MX100 tube, type “F65KOUSB.mx” or “F80KOUSB.mx” then enter.

Wait for the count to start. It may take 20 seconds before starting. The software code transfer will take about 20 minutes. Download is complete when all the LEDs on kV Control board are ON and laptop indicates download is complete.

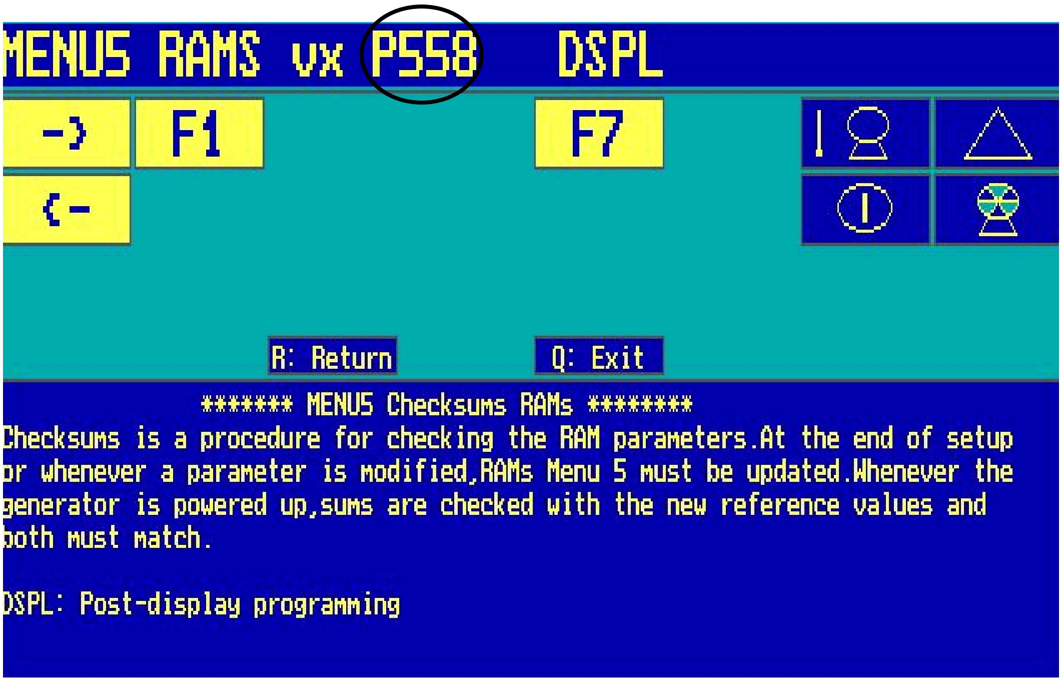
Normally, the kV Control board will reset at the end of transfer and all the LEDs will scroll.

If not, reset the kV Control board.

PROTEUS XR/a	4/4	SW JEDI 7-2

9. Verify the software version is V5.58.

From the main screen, type F1, then ALT S and select menu 5 with the arrows.



******* MENUS Checksums RAMs ********

Checksums is a procedure for checking the RAM parameters.At the end of setup or whenever a parameter is modified,RAMs Menu 5 must be updated.Whenever the generator is powered up,sums are checked with the new reference values and both must match.

DSPL: Post-display programming

10. Select menu 2 with the arrows, select LIST, and clear generator error log. (^H, then W)
11. To exit program, press Q, or R to return then ESC, or ESC twice.

PROTEUS XR/a		**1/5**	**SW JEDI 7-3**
subassembly: **TUBE REPLACEMENT SOFTWARE PROCEDURE**			
purpose:			*version no*. 0 *date:* **20/12/99**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* ***0h 15*** **min**

1 SUPPLIES

None.

2 TOOLS

- Service laptop with floppy drive.
- Service tools
  - JEDI Service Software
  - 9-wire serial cable Part No. 2207478.

3 SAFETY PRECAUTIONS

Not applicable.

4 PREREQUISITES

Basic knowledge of PC based computer laptop, DOS and usage of Microsoft WINDOWS.

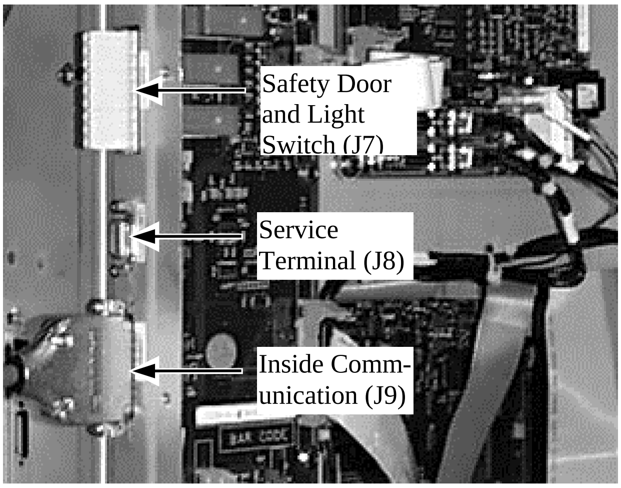
Knowledge of Service Software (refer to page 4-32, ”Service Software User Guide” Job Card).

PROTEUS XR/a	2/5	SW JEDI 7-3

5 PROCEDURE

5-1 Perform a Database backup

Refer to page 4-86 Job Card ”Backup & Restore Database Setup Parameters”.

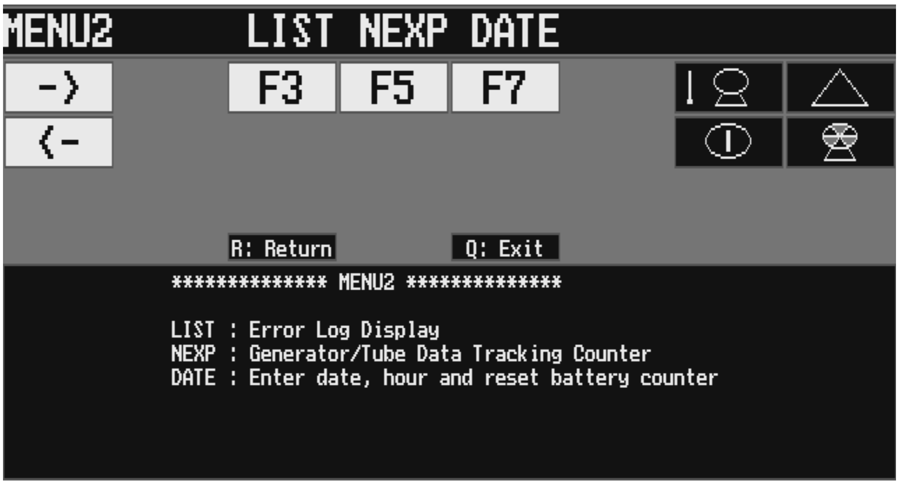


1. Connect Service laptop as follows:
    - Use the 9 pin Serial cable, part number 2207478, to connect serial line of Service laptop to connector XJ8 on the I/F board.
2. Restart the computer in DOS mode (for software download or database backup, it is required to run asian.exe under DOS to avoid communication problem).
    - With the mouse, click on START, SHUTDOWN, RESTART COMPUTER UNDER DOS MODE.
3. Run the program:
    - select Disk Drive from where you want to run the program: C:\JEDI [enter] or A: [enter]
    - key in : “asian” [enter]
4. Save memory
    - From the laptop software main screen, type “F6: save memory”.

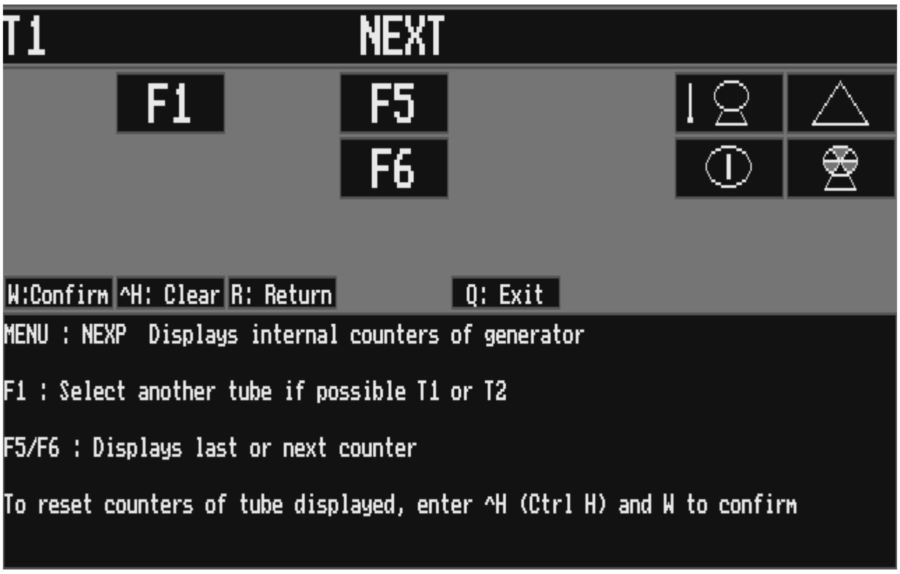
PROTEUS XR/a	3/5	SW JEDI 7-3

5-2 Reset Tube Data tracking counter and error log.

1. Type ALT-S to jump to Service Menu.
2. Select menu 2 with the arrows.
3. Type F5 to select “NEXP”


MENU2
LIST NEXP DATE
->
<-
F3
F5
F7
R: Return
Q: Exit

```
************** MENU2 **************

LIST : Error Log Display
NEXP : Generator/Tube Data Tracking Counter
DATE : Enter date, hour and reset battery counter
```


T1
NEXT
F1
F5
F6
W:Confirm
^H: Clear
R: Return
Q: Exit

```
MENU : NEXP  Displays internal counters of generator

F1 : Select another tube if possible T1 or T2

F5/F6 : Displays last or next counter

To reset counters of tube displayed, enter ^H (Ctrl H) and W to confirm
```

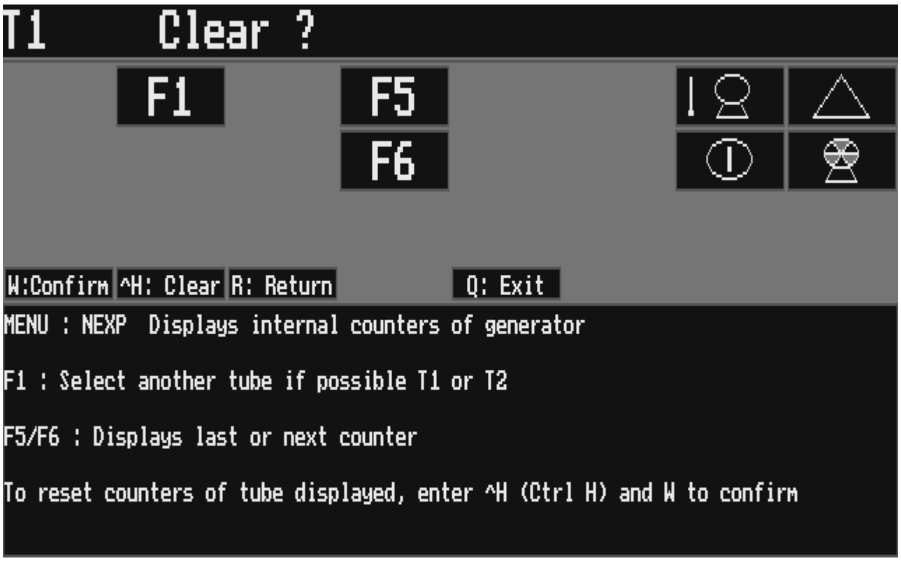
Note: ***Before resetting all the memory, it is advised to record them on table ”Generator Counter Reading Record” (Illustration 1).***

PROTEUS XR/a	4/5	SW JEDI 7-3

4. Enter ^H, press W to confirm.

All the tube related Data will be erased; only Generator related Data will be kept.

The filament aging parameter will be reset to default value.



```
MENU : NEXP  Displays internal counters of generator

F1 : Select another tube if possible T1 or T2

F5/F6 : Displays last or next counter

To reset counters of tube displayed, enter ^H (Ctrl H) and W to confirm
```

5. Type Q to go back to main screen.

5-3 Verify new tube operation, clear error log

1. Run a dozen of exposures from low kV, mA, to high kV, mA in direct workstation.
2. Verify correct operation of the system.
3. Go in menu 2, LIST (F3); Clear the Error log.
4. Exit from laptop service software.
5. Run exposures from the Operating console.
6. Take necessary steps to ship the replaced tube. Include filled out table with tube information.

PROTEUS XR/a	**5/5**	**SW JEDI 7-3**

Illustration 1 - Generator Counter Reading Record

GENERATOR COUNTER READING RECORD	
Date of reading:	Date of install:
Address of installation:	Generator identification: Serial number: Software version: Options: (AEC)
X-Ray system description:	

Counter name	Tube data	Explanation
NO WARMUP		Number of skipped Warm-up (N/A on Tiger)
RXGSF	H	Cumulated exposure time on small focus
RXGLF	H	Cumulated exposure time on large focus
RXSCOP	H	Cumulated exposure time in fluoro (N/A on RAD.)
ROTANOD	H	Cumulated Anode rotation time
NEXPSF		Cumulated Number of exposure on small focus
NEXPLF		Cumulated Number of exposure on large focus
N100%SF		Cumulated Number of exposure on small focus at 100 % Power (N/A on Tiger)
N100%LF		Cumulated Number of exposure on large focus (N/A on Tiger)
NAMOR		Cumulated Number of spits
KJSF	. E	Cumulated dissipated power on Small focus
KJLF	. E	Cumulated dissipated power on Large focus
TIME_ON	H	Total generator Power On time (Not erasable)
N_EXP_G	H	Total generator number of exposure (Not erasable)

PROTEUS XR/a			**1/3**	**IST JEDI 5-2**
subassembly: **TUBE CONFIGURATION**				
purpose:			*version no*. 1 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 15*** **min**	

1 SUPPLIES

None.

2 TOOLS

- Service laptop with floppy drive.
- Service tools
  - JEDI Service Software
  - 9-wire Serial cable Part No. 2207478.

3 SAFETY PRECAUTIONS

Not applicable.

4 PREREQUISITES

The service laptop must be configured and software installed (refer to page 4-32 “Service Software User Guide” Job Card).

PROTEUS XR/a	**2/3**	**IST JEDI 5-2**

5 PROCEDURE

5-1 Loading Software according to tube present in the installation

Two, four or six database are available on the JEDI Service Software supplied in Service Tools depending of the configuration:

- one for 32 kW tube: type RAD 12,(Low speed) File = F32RAD12.mx
- one for 32 kW tube: type RAD 14,(Low speed) File = F32RAD14.mx
- one for 50 kW tube: type RAD 14,(High speed) File = F50RAD14.mx
- one for 65 kW tube: type RAD 14,(High speed) File = F65RAD14.mx
- one for 65 kW tube: type RAD 21,(High speed) File = F65RAD21.mx
- one for 80 kW tube: type RAD 21,(High speed) File = F80RAD21.mx

Four database for the system equipped with tube fan:

- one for 65 kW tube: type RAD 21,(High speed) File = F65RA21F.mx
- one for 80 kW tube: type RAD 21,(High speed) File = F80RA21F.mx
- one for 65 kW tube: type MX 100,(High speed) File = F65KOUSB.mx
- one for 80 kW tube: type MX 100,(High speed) File = F80KOUSB.mx

Load from Service laptop the file corresponding to the tube present in the installation and the customer configuration Refer to Job Card “Back-up and Restore Database Setup Parameters” CAL Jedi 8-6.

Note: ***When replacing the database file of RAD12, 14, 21 with database file of MX100 or in reverse, pay attention to replace the Rotation Capacitor Set (refer to Job Card D/R JEDI 17-38 in Section 3 of Chapter 9) and ensure its correct match with the X-ray tube type.***

5-2 Verify

According to the tube used in the installation, verify:

1. If 32 kW database loaded for tube RAD 12 or RAD 14
   - The maximum mA displayed on the console must be 400 mA for 80 kV.
2. If 50 kW database loaded for tube RAD 14
   - The maximum mA displayed on the console must be 630 mA for 80 kV.
3. If 65kw data base loaded for tube RAD 14 or RAD 21
   - The maximum mA displayed on the console must be 800mA for 80kV
4. If 80kw data base loaded for tube RAD 21
   - The maximum mA displayed on the console must be 1000mA for 80kV
6. If 65 kW database loaded for tube MX100
   - The maximum mA displayed on the console must be 800 mA for 80 kV.
7. If 80 kW database loaded for tube MX100
   - The maximum mA displayed on the console must be 1000 mA for 80 kV.

PROTEUS XR/a	**3/3**	**IST JEDI 5-2**

WARNING **DO NOT USE DATABASE DOESN'T MATCH, SUCH AS 32 KW FOR 50 KW TUBE OR 50 KW FOR 32 KW TUBE.**

PROTEUS XR/a			**1/7**	**CAL JEDI 8-4**
subassembly: **WORK STATION PARAMETER**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to* / /	*from* *to*	*Time:* ***0h 15*** **min**	

1 SUPPLIES

None.

2 TOOLS

- Service laptop with Floppy Drive
- Service tools
  - JEDI service software
  - 9-wire serial cable Part No. 2207478.

3 SAFETY PRECAUTIONS

The JEDI is preprogrammed. Therefore, even if the program seems to correspond to the room parameters, it must be double checked, for example, for AEC enable, wall Bucky enable.

4 PREREQUISITES

Service laptop must be configured and software installed (refer to page 4-32 “Service Software User Guide” Job Card).

5 PROCEDURE

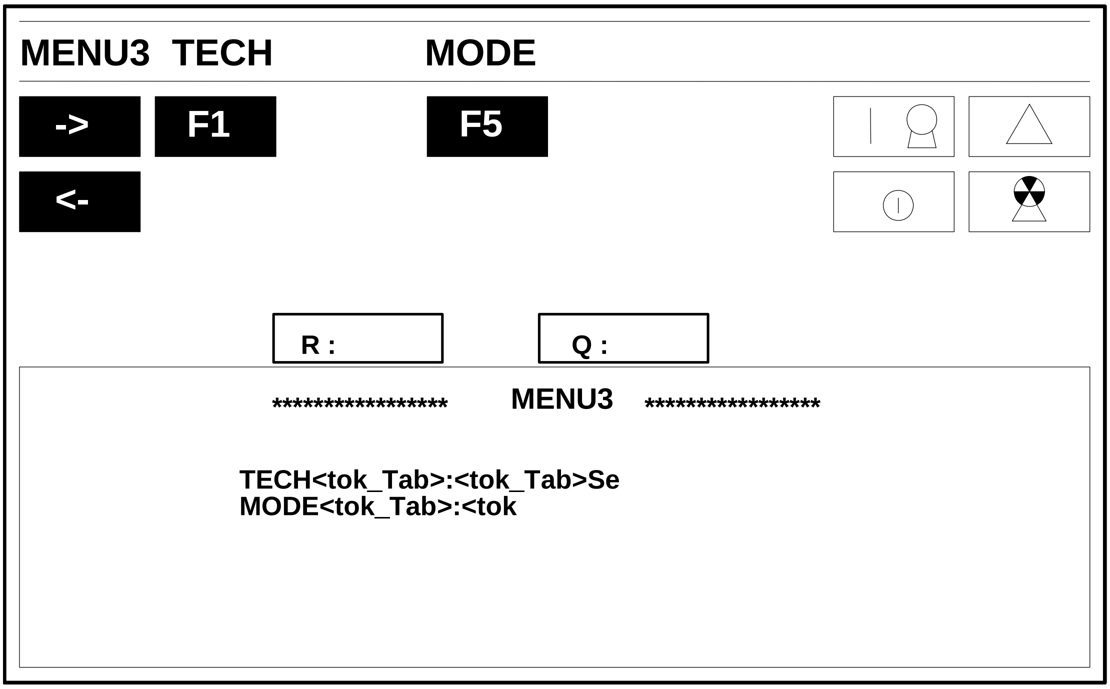
5-1 Introduction

Workstation programming uses function keys indicated on screen for the following :

- workstation select,
- tube select,
- define nominal number of exposures for 2-point mode operation,
- AEC : types of chamber and number of pickup fields in each,
- Film-screen combination select, (if only one Select A).

5-2 Calling the Subroutine

Call TECH (setup mode, menu 3, function key [F1]).



```
*****************     MENU3    *****************

TECH<tok_Tab>:<tok_Tab>Se
MODE<tok_Tab>:<tok
```

Illustration1 - Setup Mode, Menu 3

Resulting display is shown in Illustration 2.

5-3 Parameter Selection

Note: ***Any new parameters created must be stored in the installation report (same as Illustration 3).***

1. Workstation Selection

OFF	No selection
SPE *	Anatomic (for RF room)
DIR*	Anatomic (for RAD room)
POMU	Wall-mounted Bucky (i.e. SG50 or SG70)
SETE	Spot-film device technique on remote-controlled table (i.e. Prestilix 1600)
TOPO	Tomography Bucky
TOSE	Tomography spot-film device technique
POTA	Table-mounted Bucky
PULM	Pulmorapid
CHAN	Film changer
TOCO	Special tomographic applications
SECO	Spot-film device technique on conventional table
NUME	Digital mode
TONU	Digital tomography

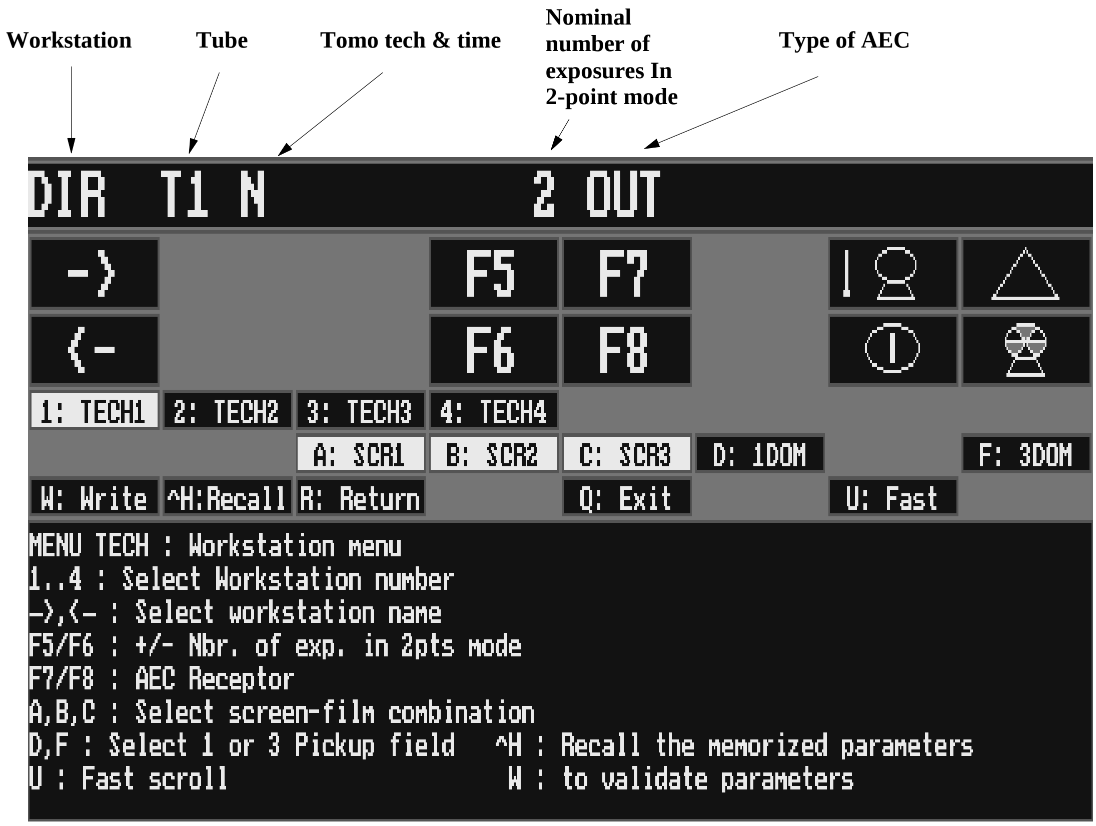
Use the [!] and [z] keys to select.

* For RAD

TECH 1 = DIR
TECH 2 = POTA (TABLE BUCKY with moving grid) or DIR (if fixed grid)
TECH 3 = POMU (with moving grid) or DIR (if fixed grid) or OFF (if no Wall Bucky)
TECH 4 = TOPO (if existing)

Note: ***For systems equipped with no Table configuration, TECH1 should be set DIR, TECH2 and TECH4 should be set OFF.***

PROTEUS XR/a	4/7	CAL JEDI 8-4


Workstation
Tube
Tomo tech & time
Nominal number of exposures In 2-point mode
Type of AEC
DIR T1 N 2 OUT
->
<-
F5
F6
F7
F8
1: TECH1
2: TECH2
3: TECH3
4: TECH4
A: SCR1
B: SCR2
C: SCR3
D: 1DOM
F: 3DOM
W: Write
^H:Recall
R: Return
Q: Exit
U: Fast

```
MENU TECH : Workstation menu
1..4 : Select Workstation number
->,<- : Select workstation name
F5/F6 : +/- Nbr. of exp. in 2pts mode
F7/F8 : AEC Receptor
A,B,C : Select screen-film combination
D,F : Select 1 or 3 Pickup field   ^H : Recall the memorized parameters
U : Fast scroll                     W : to validate parameters
```

Illustration2 - Workstation Menu

2. Tube Selection

   T1 Tube 1 only

3. Select the number of nominal exposures for 2-point mode operation.

   Suggested values are given below:

   DIR N = 2 POTA N = 2
   POMU N = 2

   Use function keys [F5] and [F6] to select.

4. Selection of Exposure Chamber

   IN1 Ionization chamber 1 (for Table Bucky workstation POTA).
   IN2 Ionization chamber 2 (for Wall Bucky Workstation on - POMU).

   Select AEC in or out using function keys [F7] et [F8]. Each chamber corresponds to a specific technique, i.e. POMU and POTA.

PROTEUS XR/a	5/7	CAL JEDI 8-4

5. Control Console Function Key assignment

   Function keys are assigned using the alphanumeric keyboard ([1] corresponds to function key 1, etc., up to 8). Use the shift key for numbers 0 to 9.

   With the RAD Console only four techniques are available.

   The technique selected is shown in reverse video in zone 3.

6. Selection of screen-film combination used

   Keys [A], [B] and [C] are used to select the first, second and third screen-film combinations, respectively.

   The combination selected is displayed in reverse video in zone 2.

   Press the key again to cancel a selection.

   One combination is always selected. Select Key A for the RAD used screen film combination.

7. Selection of Number of Pickup Fields

   The number of pickup fields of the exposure chamber selected for AEC Mode with ionizing chamber or II must be keyed in:

   [D] middle pick-up field (one),
   [F] three pick-up fields.

   The number of pick-up fields is displayed in reverse video in zone 3.

8. Validation

   Use [W] to validate all values for a given function appearing on the screen.

5-4 Renard or Normal Scale for kV Selection

1. Go to Service Mode, and call Menu 3 using the arrows on the keyboard.
2. Call MODE by pressing F5.
3. Select NORMAL or RENARD Scale by pressing F5.
4. Press W to confirm.

PROTEUS XR/a	**6/7**	**CAL JEDI 8-4**

5-5 Date & Time

To enter the Date and Time:

1. Go to Service Mode, and call Menu 2 using the arrows on the keyboard.
2. Call DATE by pressing F7.
3. Enter date (MM DD YYYY) via numeric keypad.
4. Press W to confirm.
5. Press F1.
6. Enter time (HH MM) via numeric keypad.
7. Press W to confirm.

When replacing the battery in the CPU Board, clear the year–counter display on the right hand side via F7 and F9 to confirm.

NOTICE

Anytime programming is modified, checksum must be validated (refer to page 4-83 Calibration Job Card “Checksum Validation”).

WORKSTATION SELECT								
FUNCTION	1	2	3	4	5	6	7	8
WORKSTATION	DIR	POTA	POMU	TOPO	OFF	OFF	OFF	OFF
TUBE	T1	T1	T1	TI				
NUMBER OF EXPOSURES IN 2-POINT MODE	2	2	2	2				
TOMOGRAPHIC UNIT USED: Y1 T1 Y2 T2 Y3 T3 Y4 T4 Y5 T5	N	N	N	N				
TYPE OF CHAMBER	OUT	IN1	IN2	IN1				
mA PLATEAU TIME FOR 1-POINT MODE	-	-	-	-	-			
EXTERNAL - WORKSTATION COMMAND*	NO	NO	NO	NO				
SCREEN-FILM COMBINATIONS 1 2 3	A	A	A	A				
NUMBER OF PICK-UP FIELDS	-	3	3	3		Number of cells used in AEC		
MODE	RENARD OR NORMAL kV SELECTION							
ERGO	FULL OR MINI ERGONOMY							

Illustration3 - Workstation Parameters (Example for RAD with Wall Bucky and two Ion-chambers)

PROTEUS XR/a			**1/1**	**CAL 011**
subassembly: **X-ray Tube Warm Up**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***2min***	

1 SUPPLIES

None.

2 TOOLS

None.

3 SAFETY PRECAUTIONS

WARNING **THE ROOM SHOULD BE FREE OF A PATIENT OR PERSONNEL**

4 PROCEDURE

1. Power on the system.
2. Close collimator blades or block x-ray output.
3. Take 2 exposures (30 seconds apart) with the following technique Parameters:
    - Table top receptor
    - Large focal spot
    - 70 kV
    - 200 mA at 1 sec
4. Once exposures are taken the system is ready for use.

PROTEUS XR/a			**1/23**	**CAL JEDI 8-2**
subassembly: **Automated AEC Calibration**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **1h**	

QUICK AEC CALIBRATION PROCEDURE:

1. Open AECcal.xls in AEC fast Calibration disk.
2. Following the instruction in this file.

NORMAL AEC CALIBRATION PROCEDURE:

1 SUPPLIES

None.

2 TOOLS

- At least 2 cassettes of each screen (18x24 cm for Bucky or 24x30 cm)
- Sensitometer
- Densitometer
- Measuring tape
- Pocket calculator
- Plexiglass plates, 5 cm thick, to cover the range from 5 cm to 25 cm, or a plastic bucket to fill with water
- A lead sheet, 2mm thick, around 18 x 12 cm, will be useful to split 2 exposures on 1 film, or to mask a measurement cell.
- 2 cassettes 36x43 and 18x24 for format correction.

AND

- Service tools
  - JEDI service software
  - 9-wire serial cable Part No. 2207478.

3 SAFETY PRECAUTIONS

WARNING **BE SURE TO PERFORM TUBE WARM PROCEDURE**

Standard precautions for work with ionising radiation.

4 PREREQUISITES

AEC set-up is the last step of the system calibration. In consequence:

- The positioner and tube hanger should be operational.
- The collimator should be mechanically centered, and the eventual automatic collimator adjusted.
- The X-ray generator should be completely configured.

Note: ***Use handswitch to make exposure. Console will not Beep.***

5 PURPOSE

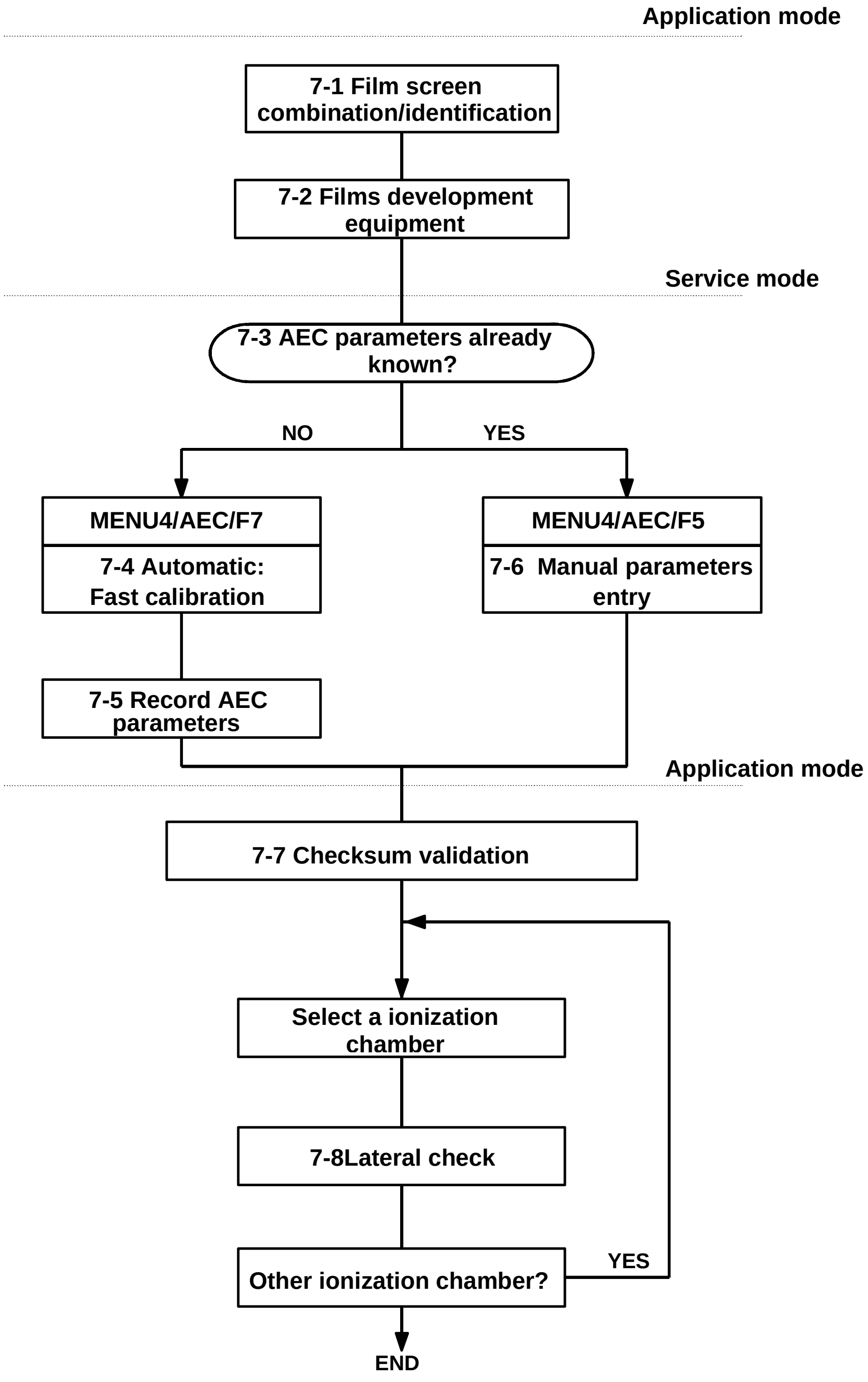

Application mode
7-1 Film screen combination/identification
7-2 Films development equipment
Service mode
7-3 AEC parameters already known?
NO
YES
MENU4/AEC/F7
7-4 Automatic: Fast calibration
MENU4/AEC/F5
7-6 Manual parameters entry
7-5 Record AEC parameters
Application mode
7-7 Checksum validation
Select a ionization chamber
7-8Lateral check
Other ionization chamber?
YES
END

Illustration - OVERVIEW

JOB CARD CAL JEDI 8-2 - Automated AEC Calibration has three purposes:

- Fast AEC film calibration menu (MENU4/AEC/F7)

The main purpose of this job card is to perform a quick AEC film calibration.

This job card explains in particular how to use the “Fast calibration” Service menu of JEDI software.

- Manual entering AEC parameters menu (MENU4/AEC/F5)

For already known screen-film combinations and/or ionization chambers, the corresponding parameters, (KVEF, KTIME, KF) and/or (KG), could be entered directly without performing the Fast Calibration.

- AEC response check

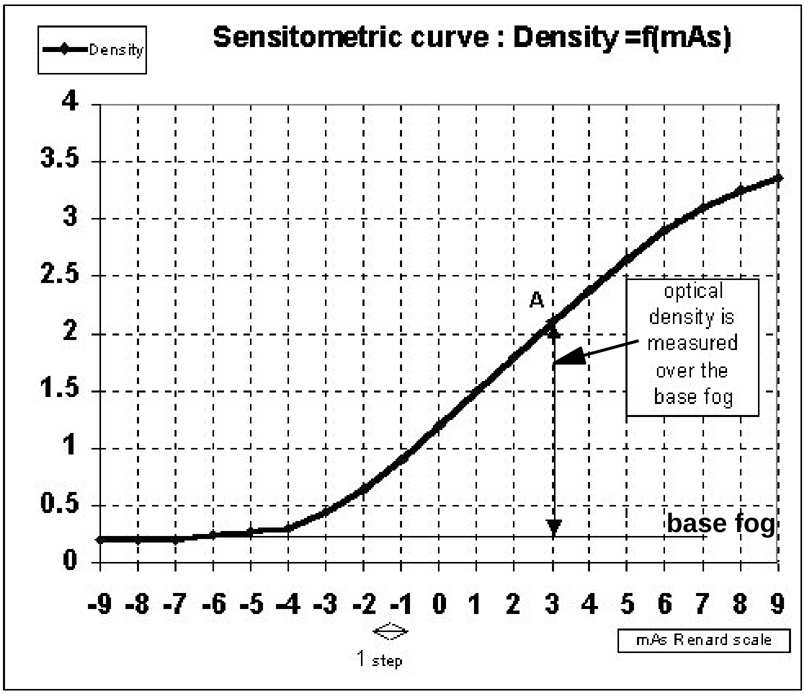
  Check the good response of ionization chambers and measuring circuitry.

6 OPERATING CONDITIONS

6-1 Definition and measurement of optical density

Optical density is measured over the based fog:

- process a non-exposed film,
- read its optical density: it is the “base fog”,
- set to 0 the densitometer on this base fog.



1 step increment in mAS will provoke a density increment of about 0,3 on the film

PROTEUS XR/a	4/23	CAL JEDI 8-2

6-2 For “AEC film calibration only”

6-2-1 Focal distance

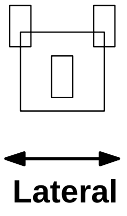
Bucky Table	Vertical Bucky
1.00 m	SID normally used, according to the grid localization distance. (most frequent:1.00, 1.50, or 1.80 m)

6-2-2 Incidence:

Orthogonal incidence.

6-2-3 X-ray field:

Minimum dimensions: Bucky: 12 x 18 cm.



Phantom centered over the ionization central measurement cell.

6-2-4 Collimation

	Automatic Collimation	Manual Collimation
Action	full field	Open the collimator blades to cassette size

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7 PROCEDURE

The goal of this section is to identify the different film/screen combinations, and classify them by sensitivity: Slow, Medium and Fast.

7-1 Film screen combinations identification

- Ask the customer which combinations of Screen / Film he is using, and their relative sensitivities: which one is the fastest, which one is the slowest.
- Limit to 3 the number of combinations to be exposed with the Automatic Exposure Control.
  Warn the customer to operate without AEC for the other combinations.
- Fill the following table:

Screen		**Film**		Film/screen combination
Manufacturer	Name	Manufacturer	Name	
				A = slowest
				B
				C = fastest

- Declare the number of Film/Screen combinations into JEDI: A, A and B, or A,B and C: refer to Job card CAL JEDI 8-4.

7-2 Films development equipment

- Check that the automatic processor is available
- Check that solution concentrations and temperatures comply with the manufacturer’s specifications.
- Plot a sensitometric curve.
  - All gray scale levels should be visible, and the base fog should not exceed 0.2 for the development equipment to be correct.
  - Gamma should be between 2 and 3.

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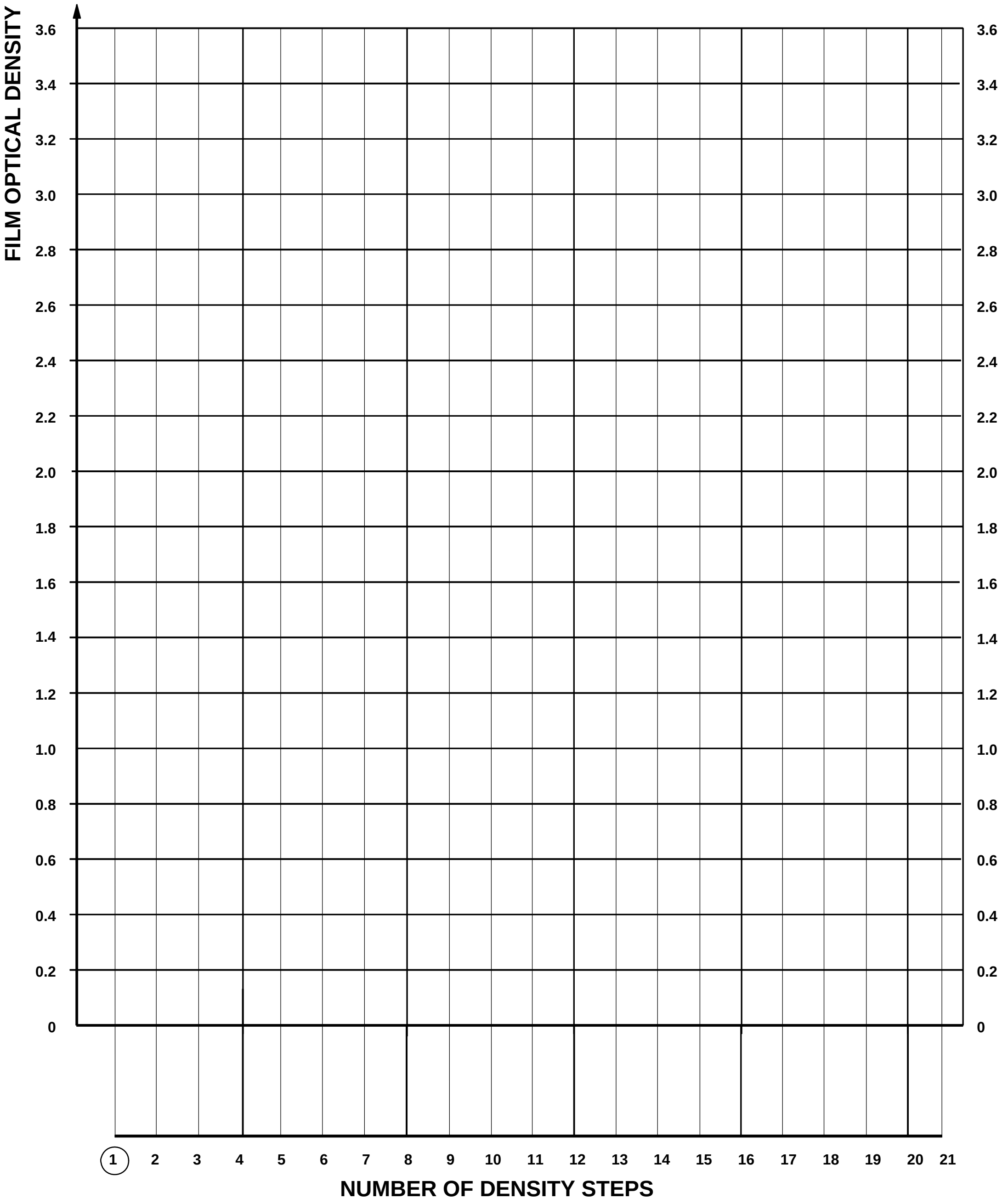
SENSITOMETRIC CURVE

FIRST INSTALLATION PLANNED ☐ **MAINTENANCE CHECK** ☐ **DATE:**



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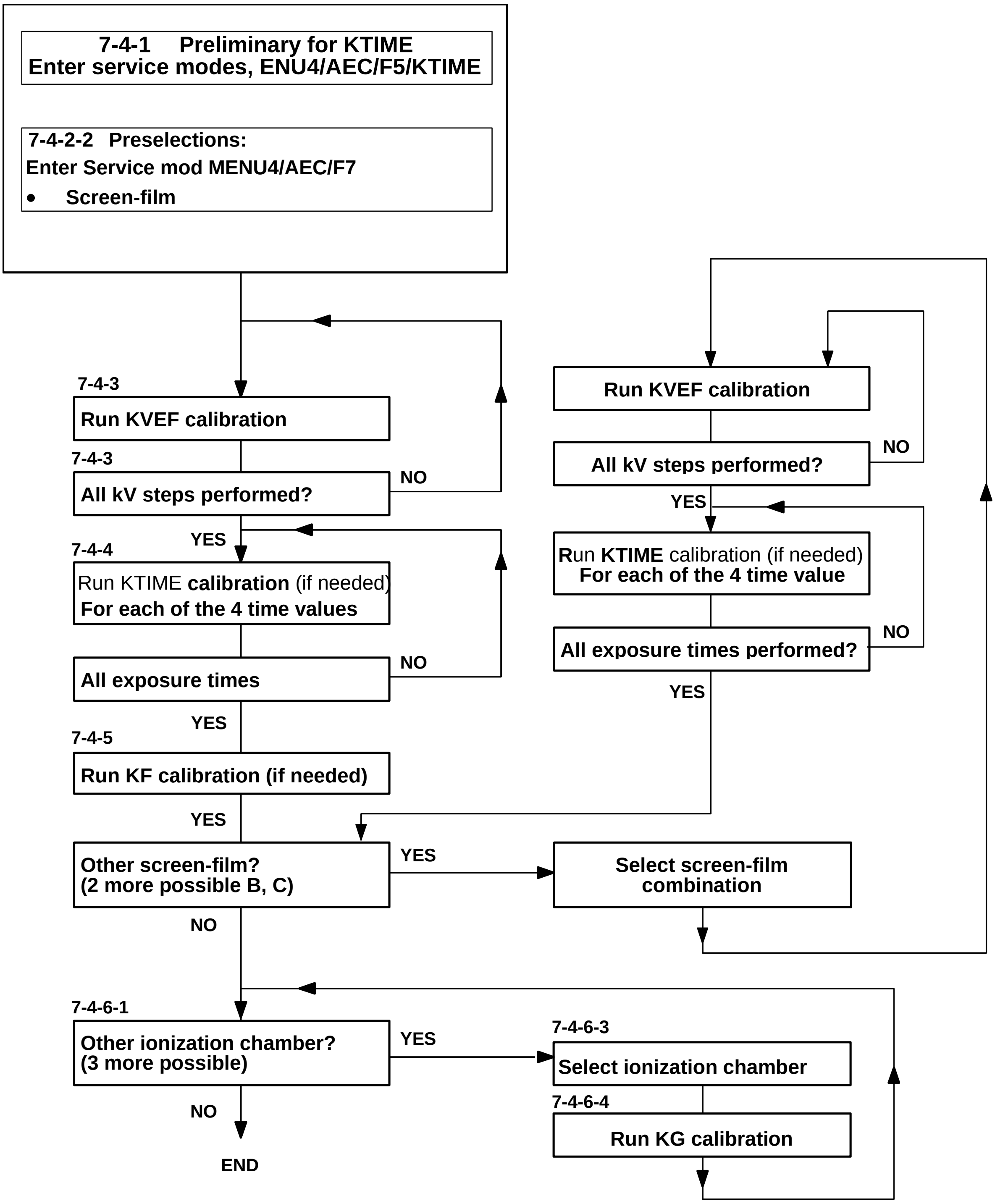
7-3 AEC parameters already known?

Known AEC parameters:	Unknown AEC parameters
• For already known screen-film combinations and/or ionization chambers, the corresponding parameters, (KVEF, KTIME, KF) and/or (KG), could be directly entered without performing the Fast Calibration. • Refer to section 7–6.	• Perform the Fast Calibration. • Refer to section 7–4.

7-4 AEC Fast Calibration Menu (MENU4/AEC/F7)


7-4-1 Preliminary for KTIME
Enter service modes, ENU4/AEC/F5/KTIME
7-4-2-2 Preselections:
Enter Service mod MENU4/AEC/F7
• Screen-film
7-4-3
Run KVEF calibration
7-4-3
All kV steps performed?
NO
YES
7-4-4
Run KTIME calibration (if needed)
For each of the 4 time values
All exposure times
NO
YES
7-4-5
Run KF calibration (if needed)
YES
Other screen-film?
(2 more possible B, C)
YES
Select screen-film combination
NO
Run KVEF calibration
All kV steps performed?
NO
YES
Run KTIME calibration (if needed)
For each of the 4 time value
All exposure times performed?
NO
YES
7-4-6-1
Other ionization chamber?
(3 more possible)
YES
7-4-6-3
Select ionization chamber
7-4-6-4
Run KG calibration
NO
END

- If an error occurs
  - To redo an exposure after an exposure, reset by pressing Z key.
  - To redo an exposure after entering the optical density, enter “0” for optical density and redo the exposure.
  - To clear optical density, press CTRL + H keys and enter the new optical density.
- Loops
  - In case of one ionization chamber:

    Run the KVEF and KTIME calibration for each film screen combination for the ionization chamber.
  - In case of multiple ionization chambers:

    Run the KVEF and KTIME calibration for each film screen combination for one ionization chamber.
    Run only the KG calibration for the other ionization chambers using the same screen film combination.

7-4-1 Preliminary for KTIME

- Enter in Service mode, then MENU4/AEC/F5/KTIME
- Check T values are equal to T values in the table below:

N	0	1	2	3	4	5
T	10 ms	100 ms	500 ms	1000 ms	2000 ms	3200 ms

- Validate each changed value by pressing the V key
- Press R to return to MENU4/AEC.

7-4-2 Initialization

- Enter in Service mode, then MENU4 / F7

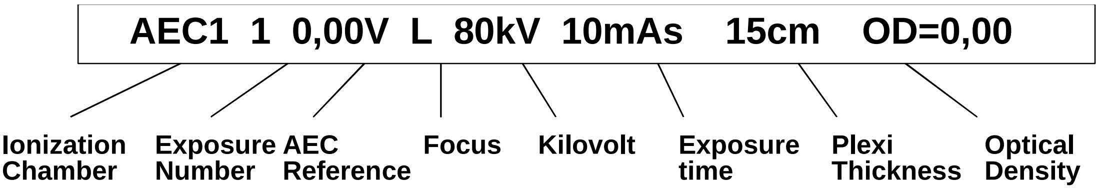
7-4-2-1 Keys description

- <- or -> keys to select the ionization chamber to be calibrated
- F1/F2 keys to select the exposure number
- F3/F4 keys to select the focus (generally Large Focus)
- F5/F6 keys to select the kV
- F7/F8 keys to select the mAs in Renard scale
- F9/F10 keys to select Plexiglass thickness
- 0 to 9 keys to enter the optical density (target or measured)
- T key to select and modify target density

7-4-2-2 Preselection

- A, B or C key to select screen film type (slow, medium, fast) (if only one film-screen, select A key) The selected film-screen key flickers.

7-4-3 KVEF parameter acquisition

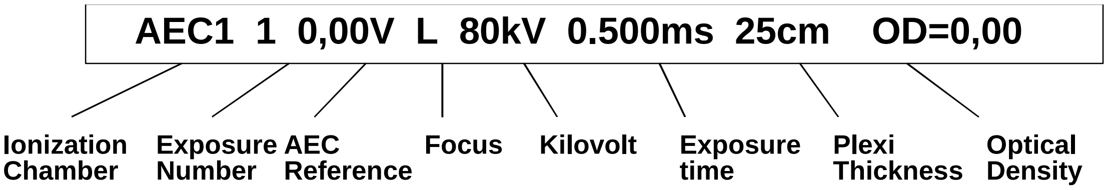

AEC1 1 0,00V L 80kV 10mAs 15cm OD=0,00
Ionization Chamber
Exposure Number
AEC Reference
Focus
Kilovolt
Exposure time
Plexi Thickness
Optical Density

1 film, 1 exposure (bucky configuration)
• Run the first exposure proposed by the software with the 1st first value (80kV) of the kV series
• Develop the film
• Measure the optical density for the film
• Enter the associated read optical density
• Validate the value with the W key
• Run the next exposure with the new parameters calculated by the software
• Develop the film(s)
• Measure the optical density for each film or image
• Enter the associated read optical density
• Validate the value with the W key - Redo the next exposure and enter the density until the V button flicker
• When the V button flickers, record in table para. 7–5 the mAs0 displayed and press V key
• Select the next kV step in the kV series (80kV, 100 kV, max kV, 40 kV and 60 kV). and repeat operation
• Start the KT time calibration by pressing V key after V button lighted at the end of the first screen-film KVEF calibration

7-4-4 KTIME Parameter Calibration (Exposure Time Correction)

7-4-4-1 Auto calibration

The calibration can be by-passed by pressing V key again.



```
AEC1  1  0,00V  L  80kV  0.500ms  25cm   OD=0,00
```

1 film, 1 exposure (Bucky configuration)
• Set the proposed Plexiglass thickness
• Run the exposure proposed by the software with 0.5s
• Develop the film
• Measure the optical density for each film
• Enter the density measured. Validate the value with W key
• Set the proposed Plexiglass thickness
• Run the proposed exposure (1s)
• Develop the film
• Measure the optical density
• Enter the associated read optical density. Redo the exposure for other exposure time, 2s, 3.2s, 10ms
• Validate the value with the W key, after entered density value
• Validate the software calculated KTIME parameter with V key
• Select the next screen/film combination if existing and start again the KVef + KTime setting procedure from para 7–4–1
• Press the V key again to enter the KF calibration (bypass the KF calibration, if not required by hitting V key again)

7-4-4-2 Warning:

In case of film too dark, after calibration, for exposure time below 10ms, you must insert an additional step between 0 and 10ms and remove the step at 2s.

How to proceed:

Write down manually the Kt values you obtained during automatic calibration for the step 10ms, 0.1s, 0.5s, 1s, 2s and 3.2s in table below (see procedure to read the value in para 7.6).

Original values from the auto calibration :

Time	T0=10ms	T1=0.1s	T2=0.5s	T3=1s	T4=2s	T5=3.2s
Value	Kt_0	Kt_1=1	Kt_2	Kt_3	Kt_4	Kt_5

1/ Use the procedure in para 7.6.1.2 to change manually the T0 to T5 time values according to table below.

2/ enter in the table below the values already known (from auto calibration, table above). Note that the 2s value is removed.

3/ Enter for T0=2ms a Kt new value which is lower than the one for T1=10ms.

4/ Run a manual exposure in application mode with an exposure time between 2ms and 10ms (ex: 120kV 10cm of plexiglass or water).

5/ Check the film darkness and adjust the Ktnew value until the darkness result is good.

- If too dark, decrease the value.
- If too light, increase the value.

Time	T0=2ms	T1=10ms	T2=0.1s	T3=0.5s	T4=1s	T5=3.2s
Value	Kt_{new}	Kt_0	Kt_1=1	Kt_2	Kt_3	Kt_5

7-4-5 KF Parameter Calibration (Format Correction)

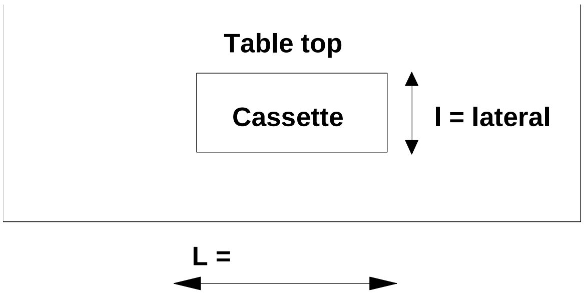
This procedure has to be run for only 1 ionization chamber, only for one screen / film combination only in case of Automatic collimation.

The phantom must cover the entire field for 36x43 format cassette.

- Format coding

X-ray field depends on the cassette size and the eventual division.

It is sensed and coded by the cassette tray and sent to JEDI.



- Rad system: format coding by Automatic collimation device for bucky

Definition formula L x l (cm x cm) included in range area	Example L x l (cm x cm)	Format code in Service laptop	Suggested KF value
171-250	13 x 18	4	1.08
381-570	18 x 24	6	1.05
571-850	24 x 30	7	1.04
851-1300	30 x 40	8	1.02
1301-2000	36 x 43	9	1.00

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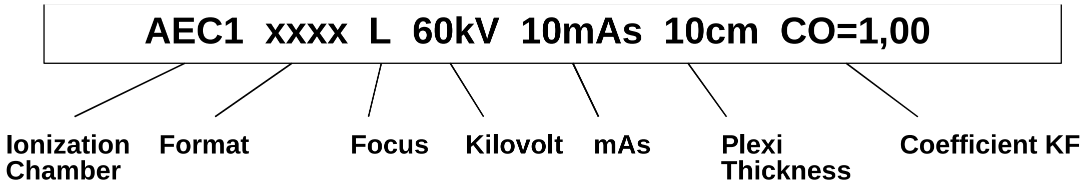
7-4-5-1 Procedure


AEC1 xxxx L 60kV 10mAs 10cm CO=1,00
Ionization Chamber
Format
Focus
Kilovolt
mAs
Plexi Thickness
Coefficient KF

- Load the first cassette of the list in table above
- Insert the cassette into the cassette tray
- Check the format code, if format is not recognized display is NO, load next cassette and check the format code, if not recognized display is NO, reload the next cassette go on
- Enter the suggested KF value, in table above according to the cassette size
- Run the proposed exposure
- Develop the film
- Measure the optical density
- Modify KF according to the table below:

Optical density	Multiply KF by
2.5 - 2	0.4
2 - 1.5	0.6
1.5 - 1.06	0.5
1.06 - 0.94	no change
0.94 - 0.5	1.5
0.5 - 0.3	2

- Repeat this procedure until optical density =1 ±6%
- Validate the value with the W key and the displayed format becomes ”NO” (no format)
- Repeat the sequence for the next cassette of the list.

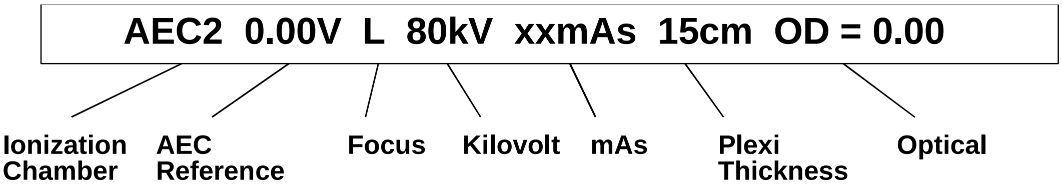
7-4-6 KG Parameter Calibration (Grid Correction)

7-4-6-1 Applicability

This procedure has to be performed for 2nd ionization chamber, if it is present., and with only one screen / film combination (the slowest for example).

In case of only one ionization chamber: Press R key to by-pass KG calibration and go to section 7–4–6–5.

7-4-6-2 Procedure


AEC2 0.00V L 80kV xxmAs 15cm OD = 0.00
Ionization Chamber
AEC Reference
Focus
Kilovolt
mAs
Plexi Thickness
Optical

7-4-6-3 STEP 1

- Select the screen / film combination A
- Select the ionization chamber with the arrow keys (AEC2)
- Set the SID at the same distance used for KVEF on AEC1. If not possible, go to STEP 3.

7-4-6-4 STEP 2

- Run the proposed exposure
- Develop the film
- Measure the optical density
- Enter the optical density value
- Repeat the same operations for the next proposed exposures until the V key flickers
- When the V key flickers, press the V key (end of calibration)
- Press the R key.

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7-4-6-5 STEP 3

Application Mode	• Hit R key to return to Application mode
	• Put 15 cm Plexiglass plate in front of Wall Stand (AEC2)
	• Set 2 Point Mode
	• Set kV to 80
	• Set the backup mAs: • mAs = mAs_0 x $(\text{SID})^2$ x 2 • mAs_0 = mAs at 80 kV for AEC1 found during KVEF calibration (see table mAs0 7–5–1) • SID = Wall Stand SID
	• Run exposure in AEC • Develop the film • Measure the density
Service Mode	• If density < 0.94 or density > 1.06 then • Go to MENU 4 AEC F5 (service mode) • Select KG (Key F3) • Select Grille 2 (Key F5/F6) • Modify KG according to table below • Repeat the procedure until density = 1 ±6%
	• If 0.94 < density < 1.06 then • KG value is good • press the V key to validate

Optical density	Multiply KG by
2.5 - 2	0.4
2 - 1.5	0.6
1.5 - 1.06	0.5
1.06 - 0.94	no change
0.94 - 0.5	1.5
0.5 - 0.3	2

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7-5 Record AEC parameters

7-5-1 Procedure for mAs0 recording

mAs0 records at the end of each kV step of KVEF calibration. Fill the table below.

mAs0 reporting table:

mAs0 AEC1					
Sensitivity	40 kV	60 kV	80 kV	100 kV	Max kV
A					
B					
C					

mAs0 AEC2					
Sensitivity	40 kV	60 kV	80 kV	100 kV	Max kV
A					
B					
C					

7-5-2 Procedure for AEC parameters recording

Access to the AEC parameters, select the Service Mode, MENU4 / AEC / F5 and fill the table below.

AEC parameters reporting table:

KVEF [F1] key					
Sensitivity	40 kV	60 kV	80 kV	100 kV	Max kV
A					
B					
C					

KTIME [F5] key						
	10 ms	100 ms	500 ms	1000 ms	2000 ms	3200 ms
A						
B						
C						

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Rad system KF	**[F9] key**		
Definition formula L x l (cm x cm) included in range area	Example L x l (cm x cm)	Format code in Service laptop	KF value
171-250	13 x 18	4	
381-570	18 x 24	6	
571-850	24 x 30	7	
851-1300	30 x 40	8	
1301-2000	35 x 43	9	

KG	**[F3] key**	
Image receptor	#1	#2
Value		

To continue the Automatic Fast Calibration, go to section 7–7, and then 7–8.

7-6 Manual entering AEC parameters menu (MENU4/AEC/F5)

The goals of this section are:

- Explaining how to enter manually AEC parameters instead of performing the automatic fast calibration.
- KVEF, KTIME, KG and KF parameters can be entered separately.

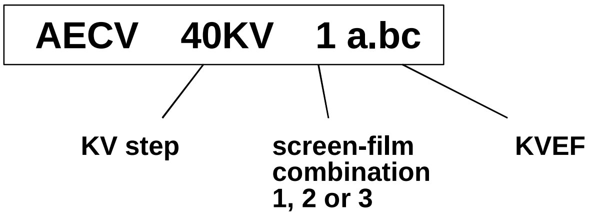
7-6-1 Procedure

- Call the AEC menu (MENU4 / AEC / F5)

AEC KVEF KG KTIME KF

7-6-1-1 Set KVEF

- Use the function key F1 to select sub-routine KVEF

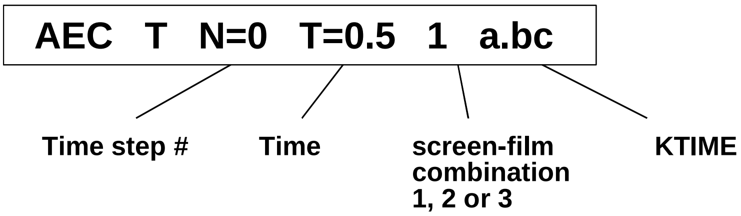


AECV 40KV 1 a.bc

- Select screen-film combination with A, B or C keys
- Select kV step 40, 60, 80, 100, or kV max with F3/F4 keys
- Set KVEF to known value with key pad
- Validate each new setting with W key
- Press the R key when settings have been completed.

7-6-1-2 Set KTIME

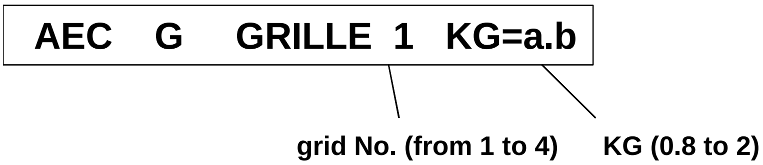
- Use function key F5 to select sub-routine KG


AEC T N=0 T=0.5 1 a.bc
Time step #
Time
screen-film combination 1, 2 or 3
KTIME

- Use the following keys to select the screen-film combination: A for combination 1, B for combination 2, C for combination3. The screen-film combination selected is displayed in reverse video
- Select time step number with F1/F2 keys. (N = 0 T = 10ms, N = 1 T = 100ms, N = 2 T = 500, N = 3 T = 1s, N = 4 T = 2s, N = 5 T = 3.2s)
- If necessary, select time with F3/F4 keys
- Set KTIME to the known value with F9/F10 keys
- Validate each new setting with the W key
- Press the R key when the settings have been completed.

7-6-1-3 Set KG

- Use the function key F3 to select sub-routine KG


AEC G GRILLE 1 KG=a.b
grid No. (from 1 to 4)
KG (0.8 to 2)

- Use the function keys F5/F6 to scroll grid (grid number corresponds to the ionization chamber number). Set KG to the known value using F9/F10 keys
- Validate each new setting with the W key
- Press the R key when settings have been completed.

7-6-1-4 Set KF

- Use function key F9 to select sub-routine KF

```
AEC   F   FORMAT   OI   KV   1.2
```

Format code (00 to 16) **KF (0.5 to 1.50)**

- Use function key F5/6 to scroll format code. Set KF to the know value using F9/F10 keys
- Validate each new setting with the W key
- Press the R key when settings have been completed.

7-7 Checksum Validation

Before exiting service mode, the checksum must be validated after settings have been completed; refer to Calibration Job Card “Checksum Validation” CAL JEDI 8-5.

7-8 Lateral cell check

7-8-1 Goal

Check that the 3 cells have the same response.

7-8-2 Principle

Repeat this procedure for each ionization chamber.

Select successively the different cells, and verify that the mAs maximum variation range does not exceed 40%.

7-8-3 Failure root causes

- Failure in the ionization chamber pre-amplifier.

7-8-4 Procedure

- Plexiglass thickness = 10 cm
- Select one image receptor
- X-ray field should be large enough to cover the 3 cells
- Application mode
- AEC on
- density correction = 0
- film screen /film key = fastest
- 3 point mode

- kV = 60
- mA = 100
- mAs = 32
- Select the cell(s) and make exposure according the reporting table
- Compute the mAs variation
- Repeat the procedure for each image receptor equipped with ionization chamber.

7-8-5 If failure

- Replace the ionization chamber and restart the complete calibration process this ionization chamber.

7-9 Reporting table

7-9-1 Ionization chamber #1

Lateral cells check

Cells	Post-displayed	mAs variation range
	mAs	
C		$\frac{mAs(\max) - mAs(\min)}{mAs(\min)}$ Should be less than 26%
C		
C		
L		
L		
L		
R		
R		
R		
LR		
LR		
LR		
LCR		
LCR		
LCR		

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7-9-2 Ionization chamber #2

Lateral cells check

Cells	Post-displayed	mAs variation range
	mAs	
C		$$\frac{mAs(\max) - mAs(\min)}{mAs(\min)}$$ Should be less than 26%
C		
C		
L		
L		
L		
R		
R		
R		
LR		
LR		
LR		
LCR		
LCR		
LCR		

PROTEUS XR/a			**1/3**	**CAL JEDI 8-5**
subassembly: **Checksum Validation**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 05min***	

1 SUPPLIES

None.

2 TOOLS

- Service laptop with Floppy Drive
- Service tools Part
  - JEDI service software
  - 9-wire serial cable Part No. 2207478.

3 SAFETY PRECAUTIONS

Not applicable.

4 PREREQUISITES

Service laptop must be configured and software installed (refer to ”Service Software User Guide” Job Card).

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5 PROCEDURE

5-1 Preliminary Remarks

NOTICE **Checksums must be validated at end of generator setup or whenever a parameter is changed.**

In the checksum validation process, the processor computes a number which is a function of all the setup parameters. When the generator is powered up, this number is computed, i.e. the sum is ”checked”.

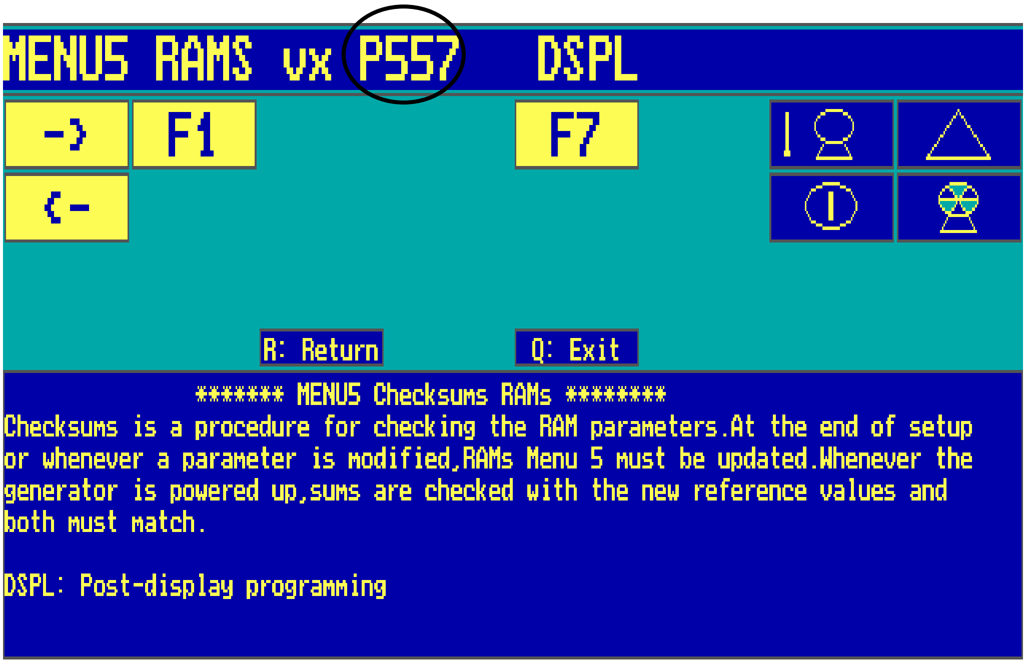
If the two numbers differ, the generator displays error an code, indicating that one or more parameters have been changed since the last time the sums were checked, or that a RAM-related incident has occurred.

Note: ***X-ray generation is inhibited if there is a checksum error.***

Note: ***The display* Va . b *on menu 5 is for the software version in the CPU board EPROMS.***

5-2 Checksum Validation

Call RAMS (setup mode, menu 5, function key [F1]



******* MENU5 Checksums RAMs ********

Checksums is a procedure for checking the RAM parameters.At the end of setup or whenever a parameter is modified,RAMs Menu 5 must be updated.Whenever the generator is powered up,sums are checked with the new reference values and both must match.

DSPL: Post-display programming

Resulting display :

RAMS CKSM MCLR

Enter function key [F1] and [V] simultaneously.

A buzzer will sound, indicating that the sums have been checked and OK on display screen.

NOTICE **MCLR is used to erase all setup parameters. Function key [F3] corresponding to this function, should never be used.**

PROTEUS XR/a		**1/3**	**CAL JEDI 8-6**
subassembly: **Backup & Restore Database Setup Parameters**			
purpose:		*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* ***0h 15min***

1 SUPPLIES

None.

2 TOOLS

- Service laptop
- Service tools
  - JEDI service software
  - 9-wire serial cable Part No. 2207478.

3 SAFETY PRECAUTIONS

Not applicable.

4 PREREQUISITES

1. The service laptop must be configured and the software installed (refer to ”Service Software User Guide” Job Card)
2. All calibrations must have been completed.

PROTEUS XR/a	2/3	CAL JEDI 8-6

5 APPLICABILITY

Setup parameters must be logged after the setup procedure has been completed, or whenever theses parameters are changed. This enable service engineers to key in parameters rapidly, i.e. when changing the KV Control Board, in the event of a battery outage.

6 PROCEDURE

6-1 CPU MEMORY BACKUP

The generator must be in application mode. The control console push buttons will be inactive during the transfer.

- Connect service laptop to XJ8 on the I/F Board.
- Power up.
- Insert the calibration floppy disk without write protection.
- From Laptop Dos, A: (It can also be run from Service Laptop Hard Disk Drive but in DOS mode).
- Type JEDI on the terminal.
- Hit [F6] to save memory.

The system ask for a file name. Default file name is A:\sv_var.mx.

- Type a file name or hit [ENTER].

During transfer, the number of sent trames is displayed.

When transfer ends, the message “Transfer successful” is displayed.
If any error is detected, the transfer stops and an error message is displayed.
See next page for list of error messages.

6-2 CPU Memory Restore Error Messages

All parameters stored in CPU NVRAM memory have been saved on calibration floppy disk. Therefore, in case of change of KV Control board you can initialize CPU NVRAM by transferring data from this floppy disk.

The procedure needs to **Unplug the cable from system I/F board Connector J118.** Then hit [F7] instead of [F6] in service mode to restore memory.

This procedure is also used to down load new software (File type for Database or Software is automatically recognized).

Note: In this case, calibration floppy disk can be write-protected.

Note: Error during memory restore may cause unpredictable result. A new transfer is required. If generator is locked, power OFF and begin again the entire memory restore procedure.

6-2-1 Error Messages

MESSAGE	ERROR
Cannot open file	- No floppy disk. - Floppy write protected (backup).
File contains data. Delete old (y,n):	The file already exists (backup). If you answer ”y”, the existing fole will be erased.
Error time out	- Generator OFF. - Service Terminal not connected to generator. - Cable to system I/F board connector J118 is connected when restore memory.
Error communication	Error during transfer. Try a new transfer from the beginning. ***Note: Ensure asian.exe software is run under DOS and not WINDOWS.***

PROTEUS XR/a			**1/1**	**CAL 012**
subassembly: **DOSE Calibration**				
purpose: **Set system configuration**			*version no.* 0 *date:* **20/2/2001**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 10min***	

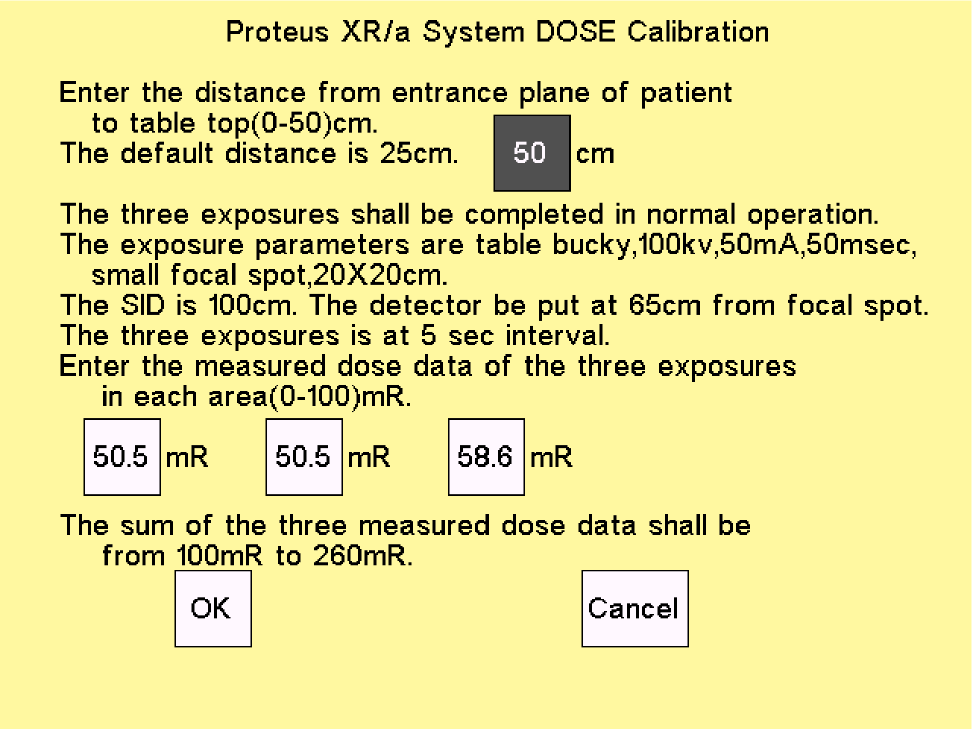
Introduction

This is a sub-step to set system configuration

Procedures

1 See Job Card CAL 002, SET SYSTEM CONFIGURATION.

2 Press DOSE CALIBRATION, enter the interface below.



Proteus XR/a System DOSE Calibration

Enter the distance from entrance plane of patient
to table top(0-50)cm.
The default distance is 25cm. 50 cm

The three exposures shall be completed in normal operation.
The exposure parameters are table bucky,100kv,50mA,50msec,
small focal spot,20X20cm.
The SID is 100cm. The detector be put at 65cm from focal spot.
The three exposures is at 5 sec interval.
Enter the measured dose data of the three exposures
in each area(0-100)mR.

50.5 mR 50.5 mR 58.6 mR

The sum of the three measured dose data shall be
from 100mR to 260mR.

3 Select the figure you want to change, and press the Up or Down arrow button to change it.

4 Press OK or CANCEL to save or not save the new configuration and return to the upper interface.

PROTEUS XR/a		**1/3**	**CAL 013**
subassembly: **Light field – X ray field alignment (For Proteus XR/a Collimator Only)**			
purpose: **Calibration**		*version no*. 1 *date:* **18/4/2001**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* ***0h 10min***

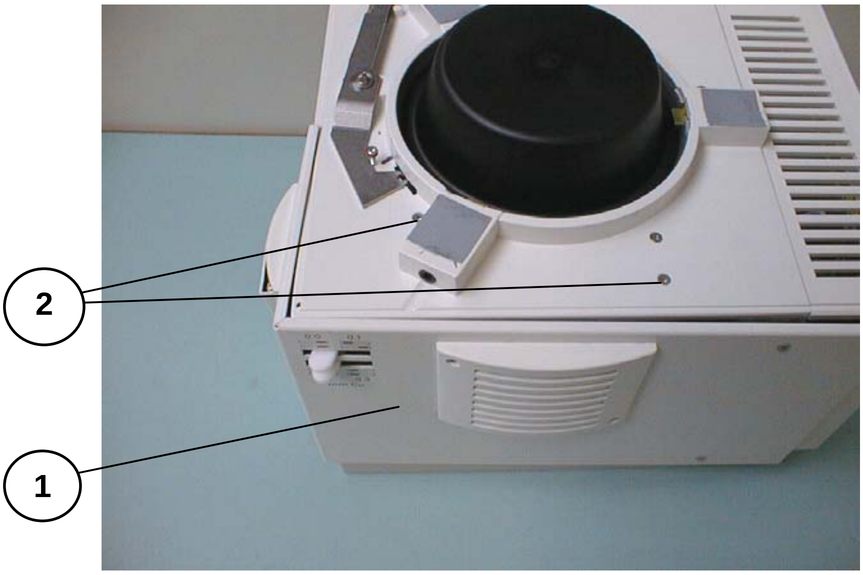


Illustration 1: collimator cover

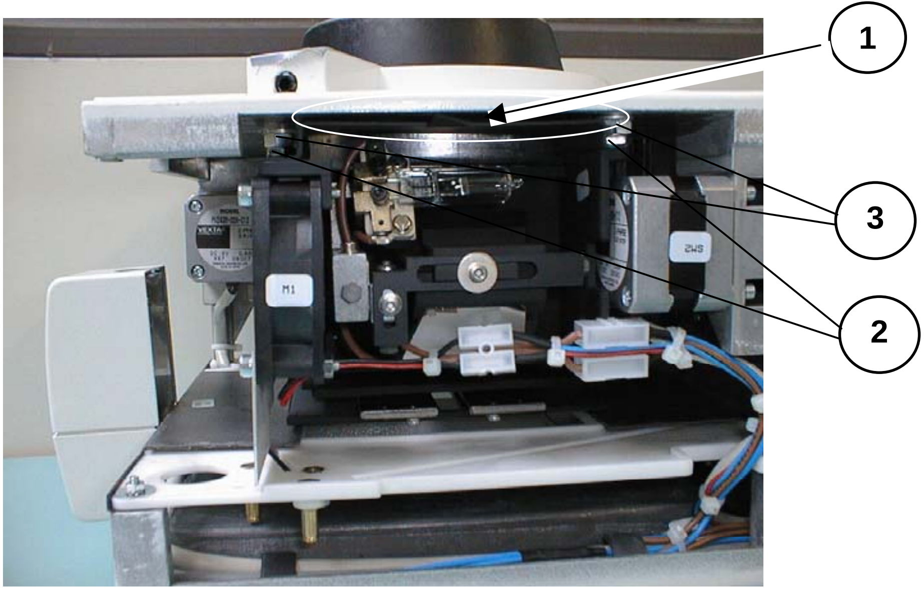


Illustration 2: light visor

PROTEUS XR/a	2/3	CAL 013

Introduction

The collimator had been calibrated in the factory before the shipment. The situation in shipment maybe will result in some small variation. Therefore, if necessary, the collimator should be realigned.

Alignment light field – x-ray field

- Power off the system.
- Remove left collimator cover sheet (Illustration 1/①, side cover with ventilation slits).
- Remove shielding piece (Illustration 2/①, temperature shield above light visor).
- Loosen front counter nuts (Illustration 2/②) and the two illustrated hexagon nuts (Illustration 2/③).
- Adjust light field position with the screws (Illustration 1/②) by Allen wrench (2mm).

Attention: Use only appropriate tools not to damage screws.

Indication: Final light field position is given after fixation of screws.

- Check light field / X-ray field superposition and brightness. Repeat adjustment if not OK.

Note: The overmuch adjustment of the screws (Illustration 1/②) may affect the light intensity equality of the light field. Apply Job Card CAL 014 to calibrate the collimator bulb to adjust the light intensity equality when necessary.

- Fix counter nuts (Illustration 2/②) and the hexagon nuts (Illustration 2/③). Secure in the same time the screws (Illustration 1/②).
- Mount shielding piece (Illustration 2/①). Apply it at first on the right side and swivel in the left side.
- Mount collimator cover (Illustration 1/①).

Note: After adjustment of the light field, it may be necessary to readjust the line laser.

Caution: The line laser is already adjusted at the factory. Only under the specific situation that the deviation between the light field center and line laser could not be limited within 3mm through adjusting the light field should the line laser be readjusted at the install sites.

For the line laser readjustments, please refer to the procedures below.

- Line laser readjustment.
    1) Open the collimator front panel with the 2 screws on the right side (2.5 mm allen wrench.)

Note: Observe ESD guidelines!

    2) Adjust the laser line with the two screws (2.5 mm Allen wrench) (Illustration 3 resp. Illustration 4) to the middle of the cross hair. The laser line must not differ for more than +/- 3mm from the middle of the crosshair.

PROTEUS XR/a	3/3	CAL 013

Illustration 3: line laser (old laser fixing)

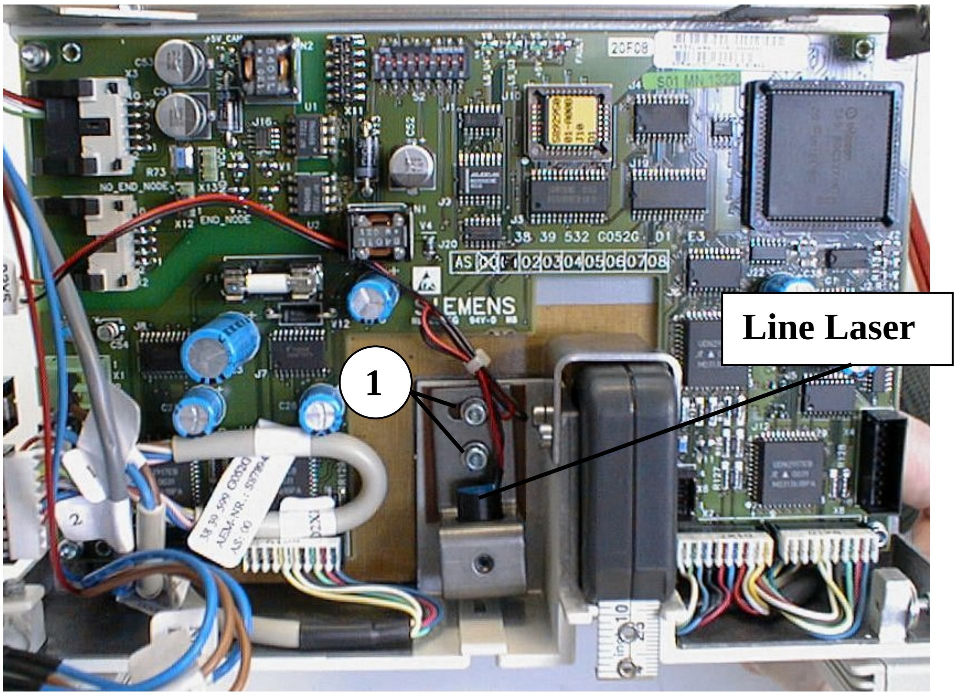
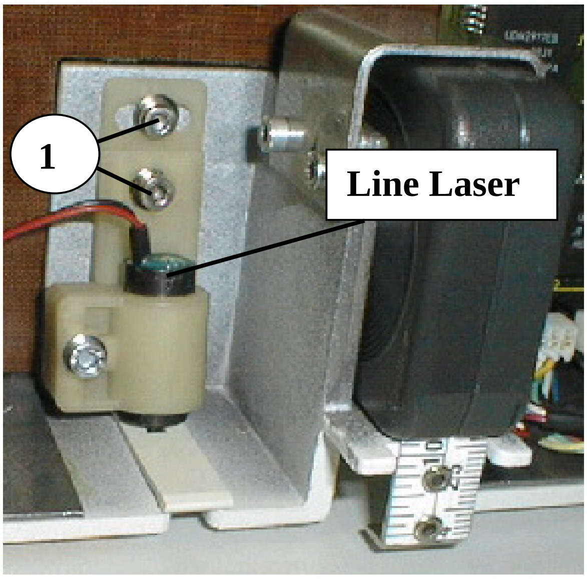


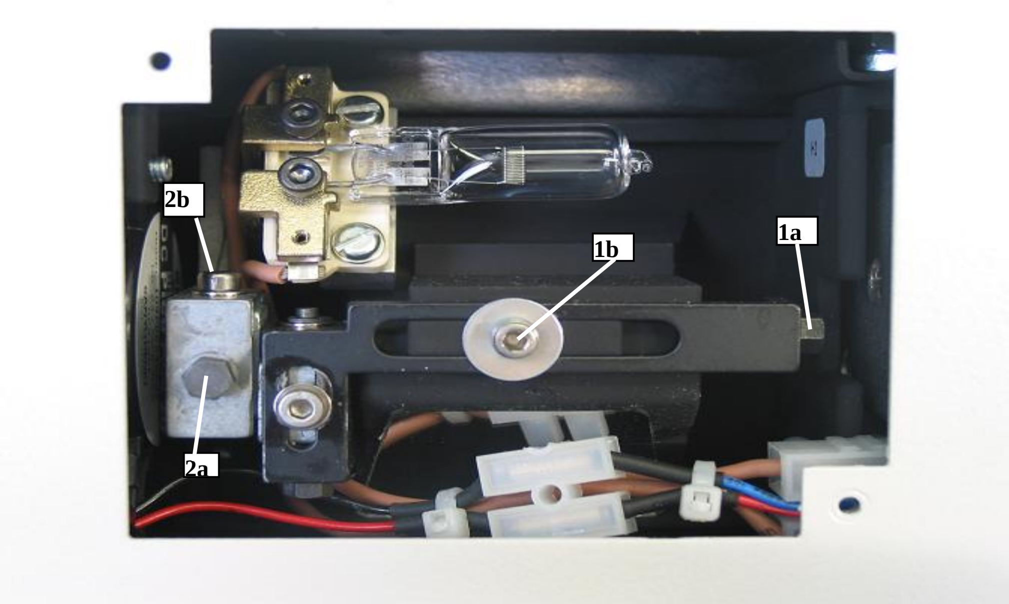
Illustration 4: line laser (new laser fixing)



3) Close the front panel and fix it with 2 screws (2.5 mm Allen wrench).

PROTEUS XR/a			**1/1**	**CAL 014**
subassembly: **Calibrate Proteus XR/a Collimator Bulb**				
purpose: **Calibration**			*version no*. 0 *date:* **18/4/2003**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 10min***	

Procedure



1a: adjustment screw for width
1b: clamping screw for width
2a: adjustment screw for height
2b: clamping screw for height

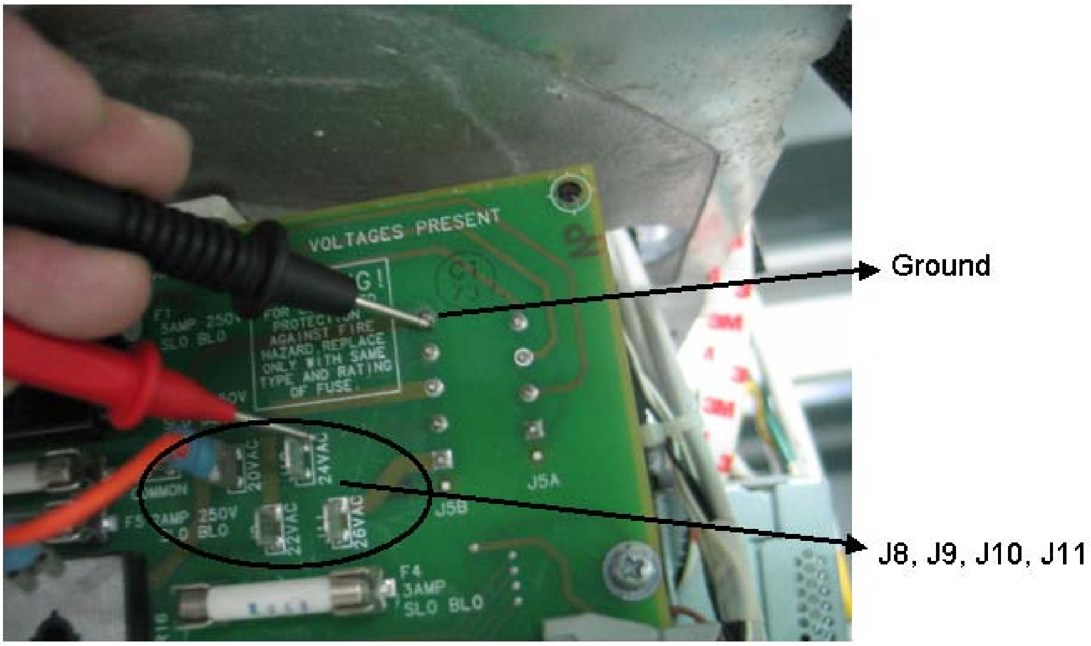
WARNING **DO NOT TOUCH THE BULB SOCKET CONTACTS TO AVOID SHORT CIRCUIT. TIGHTEN THE SCREW 2B WHILE THE BULB IS SWITCHED OFF TO AVOID SHORT CIRCUIT.**

PROTEUS XR/a			**1/1**	**CAL 015**
subassembly: **Calibrate Proteus XR/a Manual Collimator Bulb and its Voltage**				
purpose: **Calibration**			*version no*. 0 *date:* **12/12/2005**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 10min***	

Introduction
Lamp voltage on Manual collimator is provided by OTS transformer, The main power situation on site maybe result in improper voltage to Lamp on Collimator. The appropriate tap should be seleted on XT control board by measuring voltage.

Tools
RMS Multimeter

Procedure
measure voltage between ground and J8 , J9, J10, J11, on XT control board, select the appropriate tap for voltage is between 22.5VAC and 24VAC.


VOLTAGES PRESENT
Ground
20VAC
24VAC
22VAC
26VAC
J5A
J5B
F4 3AMP SLO BLO
J8, J9, J10, J11

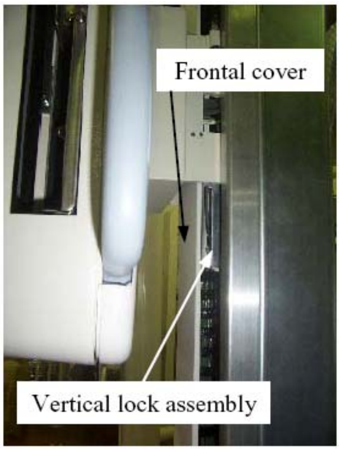
PROTEUS XR/a			**1/1**	**CAL 016**
subassembly: **Calibrate SG120 Wall Stand Vertical Locks**				
purpose: **Calibration**			*version no*. 0 *date:* **30/9/2004**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 30min***	

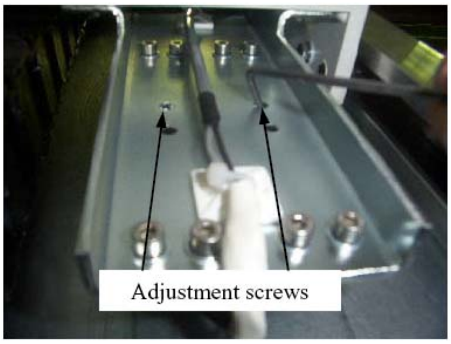
Note: ***If you have chosen SG120 Wall Stand as an option, please refer to the following contents.***

Even if the calibration of the vertical locks is performed when the equipment leaves the factory, they can be re-calibrated when needed.

Procedure

1. Make sure the equipment is switched OFF.
2. To access the vertical lock assembly, remove the lateral and frontal covers from the column assembly.
3. The vertical lock assembly is located between the vertical carriage and the column stand and is accessible from the bottom behind the bucky support assembly.





4. Set the bucky carriage at the appropriate height and adjust the brakes actuating on the 2 (1 for each brake) adjustment screws marked on the right of the figures above.
   1) Rotate the screws CCW (counter-clockwise) direction to approximate the brake to the brake surface (column stand).
   2) Rotate the screw CW (clockwise) direction to separate the brake from the brake surface.

Note: ***A distance of 0.5mm between the brake surface and the brake can be set as a start point for the calibration.***

Note: ***The calibration has to be made considering there is no friction between the brakes and the brake surface (column stand) and the noise factor.***
Check there is no collision between the brakes and the brake surface and the bucky carriage can be displaced smoothly all along the vertical whole track. Just a slight friction between the brakes and the brake surface at any point along the vertical track could be accepted in order to minimize the noise of brake actuation.

5. Assembly the covers removed in step 2.

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CHAPTER 5 FUNCTIONAL CHECK

SECTION	Content	Version	Page
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2	Tools and Test Equipment	0	5-2
3	Power ON	0	5-2
4	Table	1	5-3
5	Wall Stand (GPCP No. 600-0301), SG100 Wall Stand (GPCP No. 2225849), and SG120 Wall Stand (GPCP No. 2402562)	1	5-5
6	Cassette Tray	0	5-15
7	OTS Suspension	0	5-15
8: CHK JEDI 38-2	Performance Checks	0	5-16
8: CHK JEDI 38-4	Invasive mA Measurement	0	5-28
9	Anode Heat Integrator Functional Test	1	5-32

SECTION 1
INTRODUCTION

Functional Checks describes the procedures necessary to determine whether the Proteus XR/a system (*Refer to Illustration 5-1)* is operating correctly and performing within specifications.

All the Proteus XR/a system functions should be conform to safety regulations, local codes or other applicable standards.

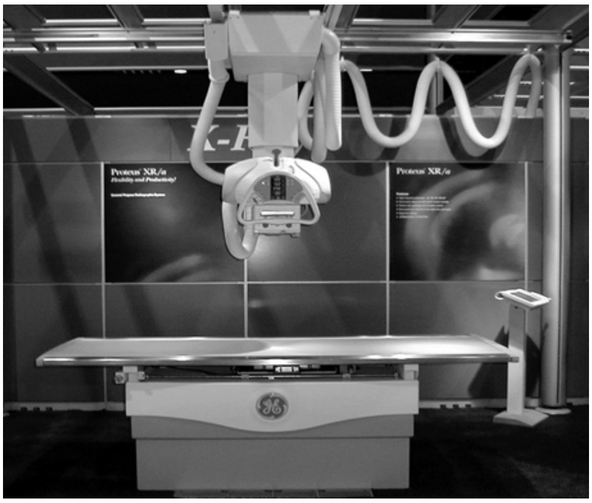
- Operational Checks.
- Performance Checks.

Operational Checks may be performed by the customer or trained personnel. These checks only indicate that the unit is functioning correctly at an operational level. They do not indicate that the unit is performing to specification.

Performance Checks must be performed by trained personnel only. These checks verify that the unit is performing to specification. It is recommended to complete these checks during and after installation, during periodic maintenance, and when the equipment is replaced or modified.

Note: ***Before performing Functional Checks all calibrations must be completed. (Refer to chapter 4 Calibration).***

Illustration 5-1
PROTEUS XR/a SYSTEM



SECTION 2
TOOLS AND TEST EQUIPMENT

In addition to the standard serviceman tool kit the following tools and test equipment will be necessary to perform the functional checks described in this chapter:

- DVM
- Metric Tape Measure
- KEITHLEY 35080A kV peak meter (or equivalent)
- RADCAL MDH2025 dosimeter (or equivalent) with 20x5-60 probe

SECTION 3
SYSTEM POWER ON

Note: ***Before this step, all electrical cable must be connected and examined***

Power on the Proteus XR/a system, verify that system console's booting correctly.

SECTION 4
TABLE

4-1 Operational Check

When the assembly and electrical connections have been completed, perform the following tests to verify the table's travel and vertical operations. Tests for the table's elevating function is required only for elevating table.

4-1-1 Check the Float Operation

Double click and depress the four-way float pedal. The tabletop should move freely in either direction. Release the foot pedal. This energizes the four longitudinal magnets, locking the tabletop securely.

Depressing the bucky switch should release the bucky magnet, and the bucky should move freely in the longitudinal.

4-1-2 Check the Up/Down Pedals

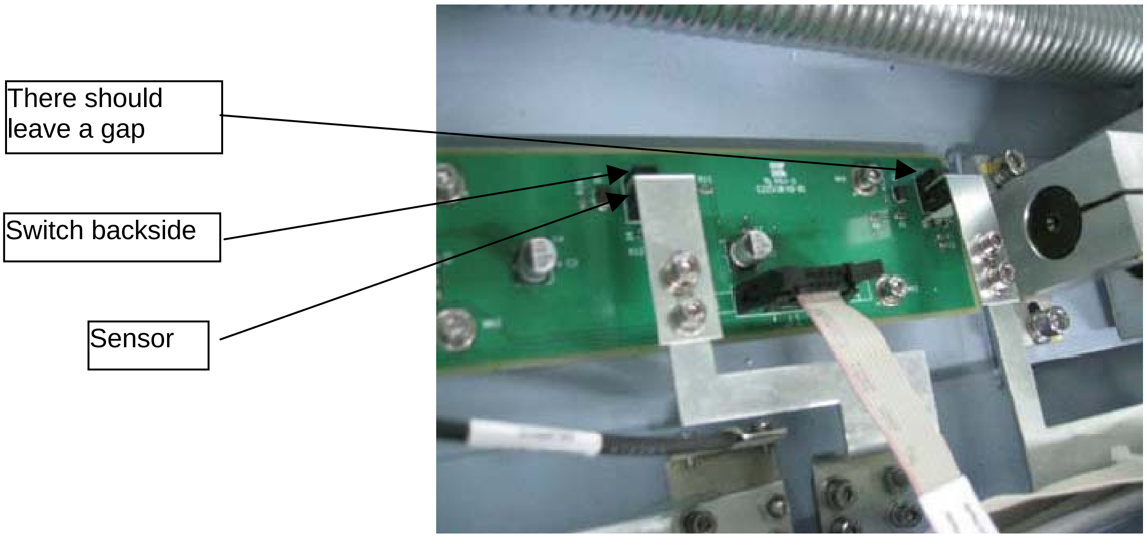
Double click and depress the Up and then the Down foot pedal. The following should occur while the foot pedal is depressed:

1. The tabletop should start to move either up or down according to which foot pedal is depressed.
2. The four-way float foot pedal (the outside pedals) should be INACTIVE (the table top four-way floating action should remain locked) while the table top is in motion.

If the table can't move when double click and depress the Up or Down foot pedal, please check the switch backside in the sensor.

WARNING

PLEASE ACTIVE THE EMERGENCY STOP OR INHIBITION BUTTON BEFORE DOING ANY ADJUSTMENT UNDER THE TABLE.

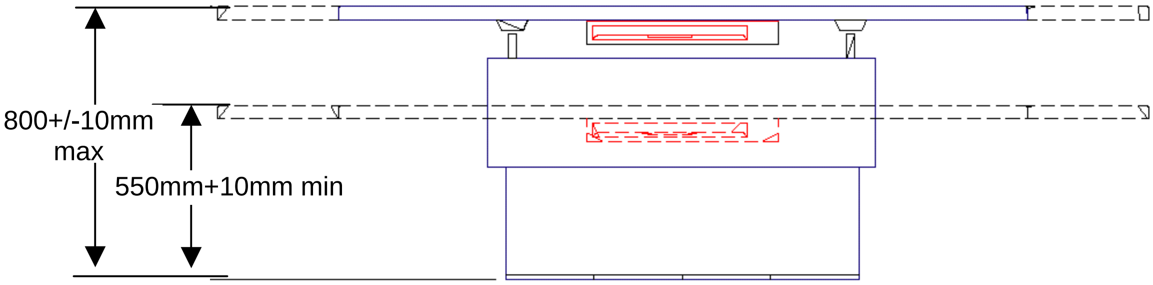


Adjust each switch backside; insert it into the notch of the sensor. Make sure the switch backside won't touch the sensor when release the foot pedal. There should leave a gap between the switch backside and the sensor.

4-1-3 Check the Table Position

Position the tabletop into its approximate central position. Lower the tabletop until it stops. The tabletop should measure approximately 550mm (560mm for table with Toe jam sensor) from the floor. Now raise the tabletop until it stops. The tabletop should measure approximately 800mm from the floor. Refer to Illustration 5-2.

Illustration 5-2
Table Height



If a modification in the height limits (lower and upper) is required to meet these specifications, it is necessary to adjust the Up/Down Limit Board located at the front of the base.

4-1-4 Adjusting the Up/Down Limit Board

See table height limitation calibration

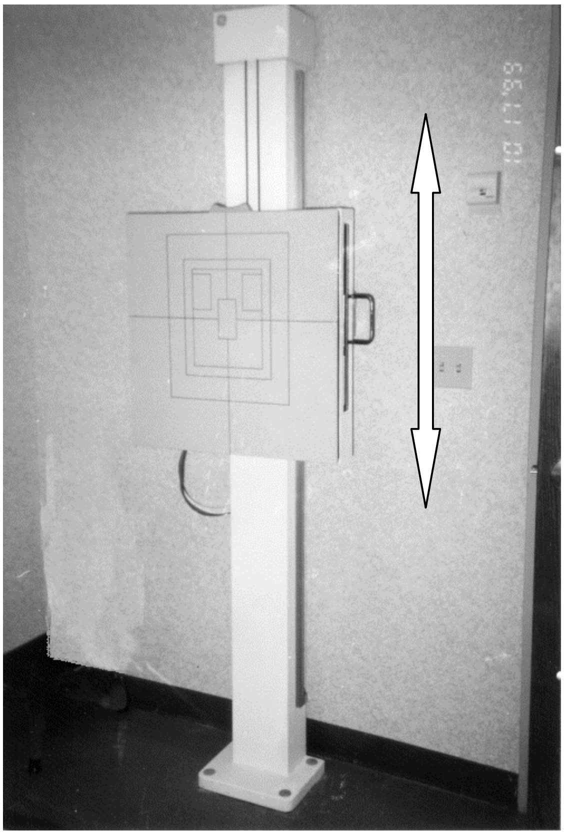
SECTION 5
WALL STAND, SG100 WALL STAND, AND SG120 WALL STAND

5-1 Wall Stand (GPCP No. 600-0301)

1. Depress the handle button, Wall Bucky should be able to move up and down freely and locks in place when released.

2. Check the bucky up and down motion is smooth and operating force is less than 5kg when inserting a 14”x17” cassette. If not, go to the Job Card CAL 008-Wall Stand (GPCP No. 600-0301), SG100 Wall Stand (GPCP No. 2225849), and SG120 Wall Stand (GPCP No. 2402562) counterweight calibration.

Illustration 5-1



5-2 SG100 Wall Stand (GPCP No. 2225849)

Note: The information in this section is concerted with the revision 6 of SG100 Wall Stand Service Manual (GPCP Number 2150297-100). For the reason of the update and change in that manual, it is recommended to see also the latest Service Manual of SG 100 Wall Stand for reference.

5-2-1 Vertical Locks

With power on: using the vertical lock handle, release the mechanical and electro-mechanical vertical locks, then verify that the carriage can move freely and smoothly over its entire range of travel with minimum side play.

If the carriage remains locked when the mechanical lock is released, check the lock board feeding the electro-mechanical lock (Refer to Form 1).

Form - 1 Lock Board Functional Checks

LOCK	FAILURE	CHECK
Vertical	Locks do not engage when releasing lock handle.	24 VDC between TP-9 and TP-10.
	Locks remain engaged when operating lock handle.	Handle microswitch or relay K11.
	Locks release is delayed when operating lock handle.	Relay K14.
Angulation	Lock remains engaged when pressing pushbutton.	24 VDC between TP-9 and TP-10 or pushbutton.

If carriage motion is not smooth and free, ensure that counterweights and trim covers are installed correctly. Add or remove counterweights until counterbalance is achieved. (Refer to Job card CAL 008, Wall Stand (GPCP No. 600-0301), SG100 Wall Stand (GPCP No. 2225849), and SG120 Wall Stand (GPCP No.: 2402562) in Chapter 4.)

Note: ***The carriage is counterbalanced when leaving the factory, however, if necessary, Apply further counterweights to achieve the counterbalance (Refer to Job Card CAL 008, Chapter 4).***

Release the lock handle partially to engage the electro-mechanical locks. Verify that the electro-mechanical locks engage before the mechanical lock (approximately 1 mm before the mechanical lock engages). If the locks do not engage, check the lock board. (Refer to Form1).

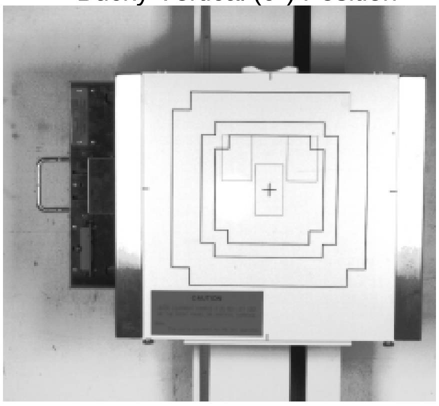
Release the lock handle all the way and verify that the mechanical lock's teeth fully engage. If not, check for misalignment, wear etc., and perform the appropriate corrective action.

5-2-2 Bucky Angulation

Push one of the angulation lock pushbuttons on either side of the Bucky support (and slightly rock the Bucky assembly if necessary) to release the angulation lock. Verify that the angulation lock releases and that the Bucky can tilt forward 20° and backward 90° freely and smoothly.

Illustration 5-2

Bucky Vertical (0°) Position



Bucky Horizontal (90°) Position

If angulation motion is not satisfactory, check the condition of the bearings at the Bucky pivot point in the Bucky support assembly.

If the angulation lock does not release, check the lock board. (Refer to Form 1).

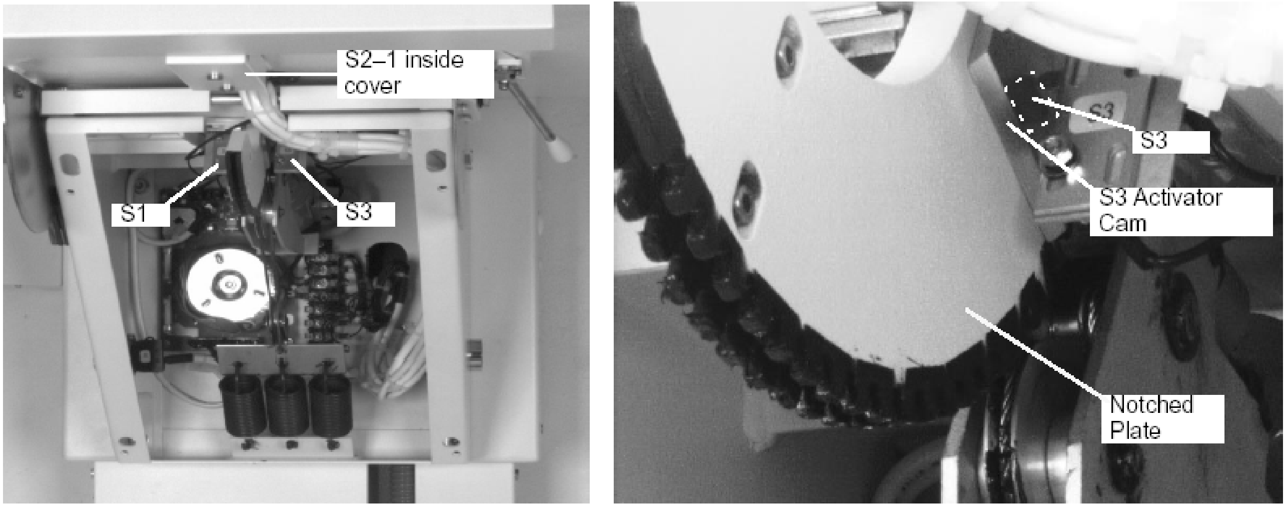
Release the angulation lock pushbutton and verify that the angulation lock engages, preventing further angulation of the Bucky. If the lock does not hold or it binds, check the lock hardware for misalignment, wear etc., and perform the appropriate corrective action.

5-2-2-1 Microswitch Actuation

Microswitch S1 should be actuated when the Bucky is within 10° of vertical.
Microswitch S3 should be actuated when the Bucky is within 10° of horizontal.

Illustration 5-3

POSITIONS OF MICROSWITCHES S1, S2, S3

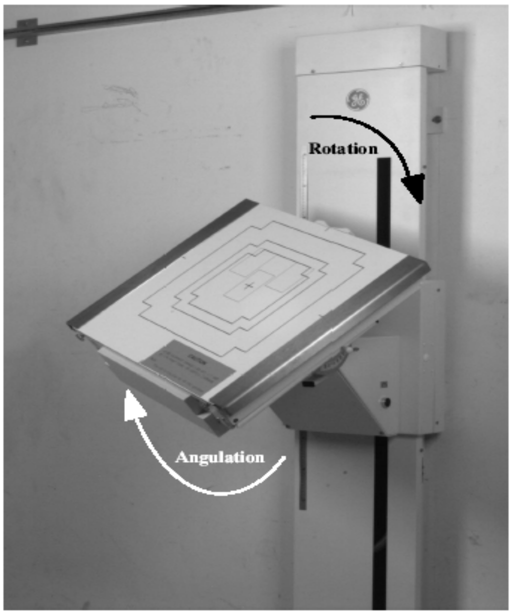


Note: ***Vertical Bucky Stands not equipped with an automatic collimator do not have microswitches S1 and S3.***

5-2-3 Bucky Rotation

With the rotation lock lever, release the rotational lock and verify that the Bucky can be easily ratated from 0^o to 180^o (upright to upside down).
Reapply the rotation lock and verify that Bucky rotation is not possible. If the lock does not engage properly, check the lock hardware for misalignment, wear etc., and perform the appropriate corrective action.

Illustration 5-4



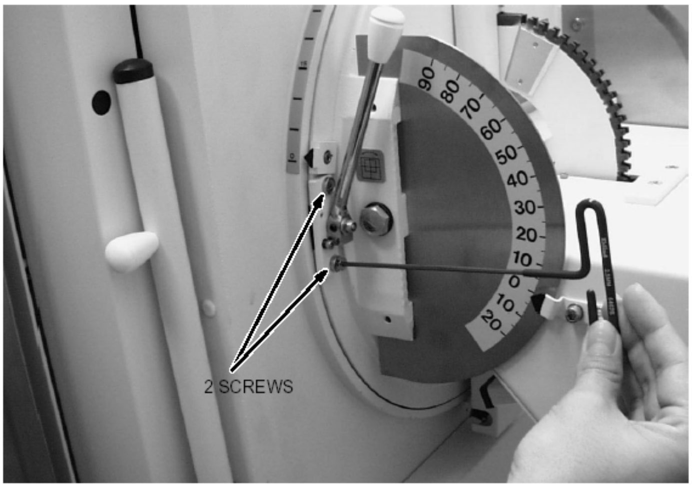
If the lock mechanism slips, it allows the bucky to rotate. Use the following procedure to adjust the arm assembly. If the brake pad is too worn and the lock mechanism still moves after making several adjustment attempts, the whole arm assembly must be replaced.

Adjustment Lock Procedure

The adjustment of the rotation lock mechanism is performed by adjusting the two threaded rods located inside the rotation lock system. These two rods push against the lock cam enabling the desired adjustment.

Remove the two screws that hold the lock arm assembly using a 2.5 mm Allen key.

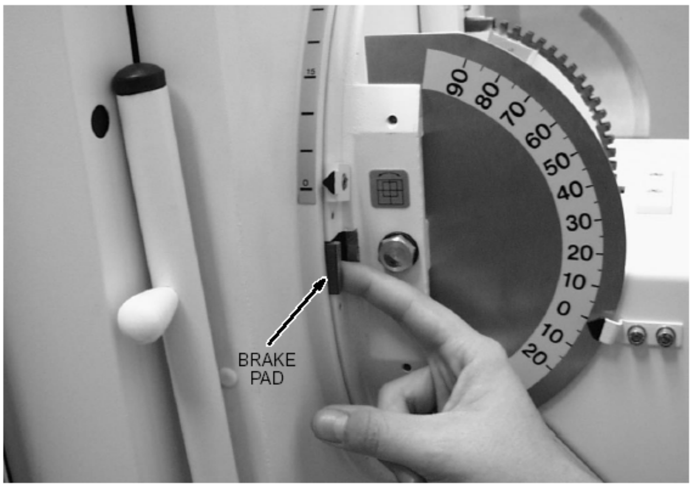
Illustration 5-5



2. Remove the arm assembly and brake pad.

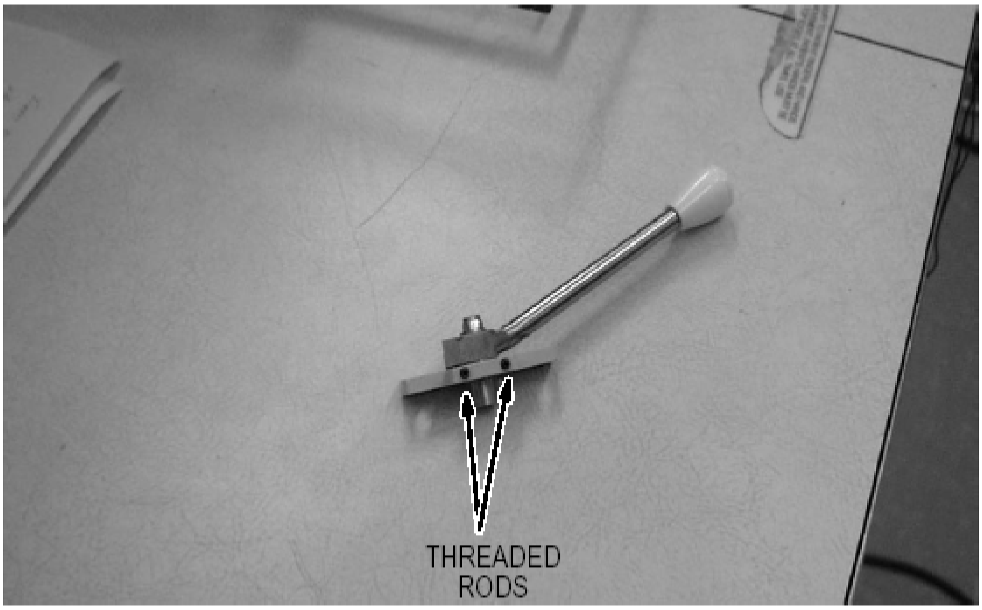
WARNING **DO NOT ROTATE ARM ASSEMBLY. REMOVE THE BRAKE PAD CAREFULLY AS IT CAN FALL INTO THE SG RATATION BOX AND WOULD BE IMPOSSIBLE TO RECOVER.**

Illustration 5-6



3. Adjust the threaded rods so that there is only enough movement between the brake pad and the arm to be able to lock the brake assembly. Use a 1.5 mm Allen key.

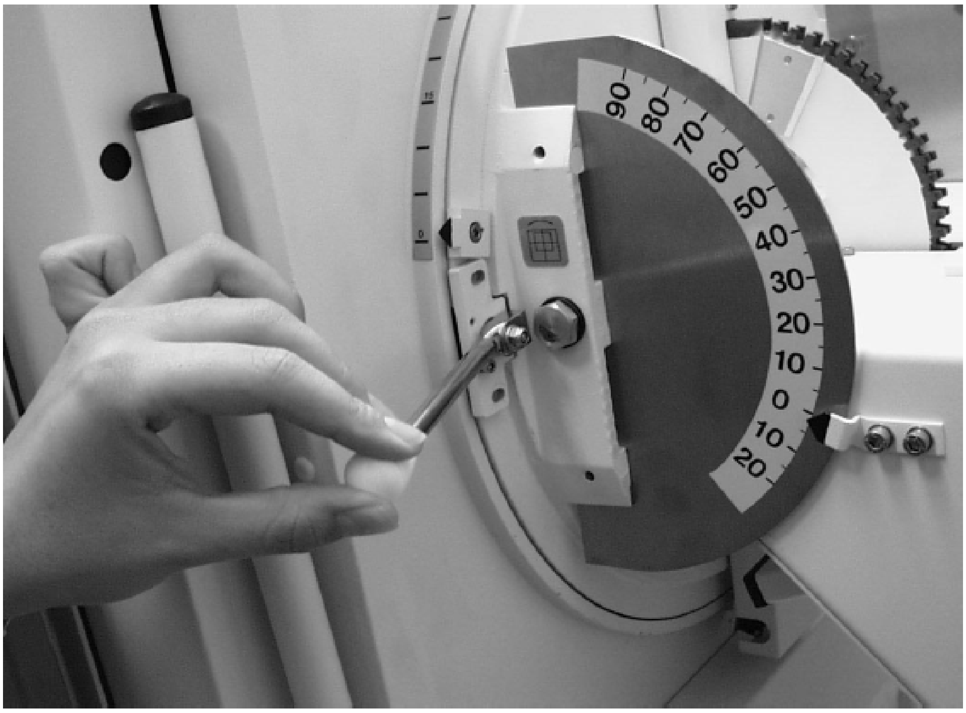
Illustration 5-7



4. Re-insert the brake pad and arm assembly in position and check to ensure there is no rotation movement. This adjustment may have to be done several times until there is no movement.

5. Once adjusted, apply loctite to threaded rods and re-insert brake pad and arm assembly.

Illustration 5-8



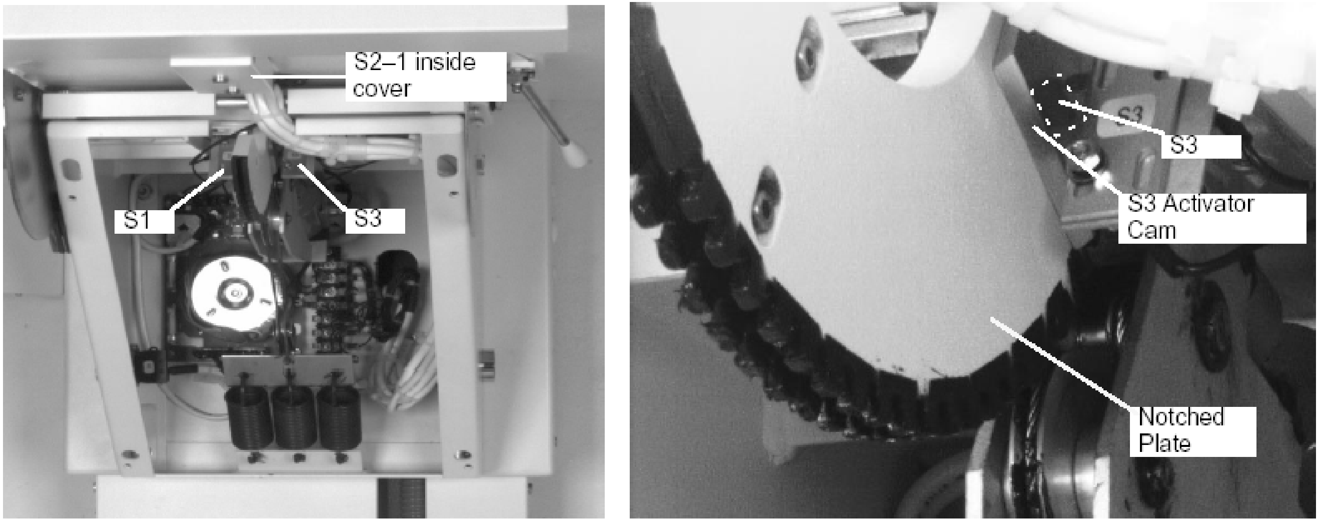
6. Re-insert the two screws removed in step 1 and retighten.

5-2-3-1 Microswitch Actuation

Microswitch S2-1 should be actuated when the Bucky is at 0°.
Microswitch S2-2 should be actuated when the Bucky is at 180°.

Note: ***Vertical Bucky Stands not equipped with an automatic collimator do not have microswitches S2-1 and S2-2.***

Illustration 5-9
POSITIONS OF MICROSWITCHES S1, S2, S3



Position of microswitches S1, S2, S3
S2-2 is found in an analogous position 180° from that shown (See also Illustration 5-10)

Detail, S3
S1 is found in the same location on the other side of the notched plate. Its activator cam is at the other extreme of the notched plate's rotation.

5-2-4 Vertical SID Points/Sitting Position

Rotate the Bucky to 0. and angulate it to 90. (horizontal), then fold down the foldable legs and lower the Bucky to the floor. Verify that microswitch S5 is actuated when the Bucky legs touch the floor. (The Bucky is at the far vertical SID point).

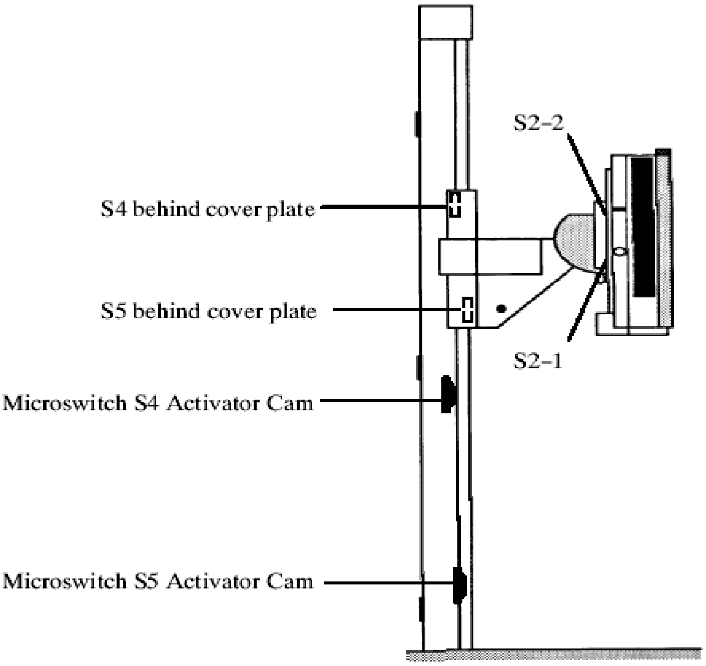
Raise the Bucky and verify that microswitch S4 is actuated when the Bucky reaches the near vertical SID point (normally the point at which the Bucky front panel surface is at the same height as the table).

(Refer to Illustration 5-10)

Note: ***Vertical Bucky Stands not equipped with an automatic collimator do not have microswitches S4 and S5.***

Illustration 5-10

POSITIONS OF MICROSWITCHES S2, S4, S5


S2–2
S4 behind cover plate
S5 behind cover plate
S2–1
Microswitch S4 Activator Cam
Microswitch S5 Activator Cam

5-3 SG120 Wall Stand (GPCP No. 2402562)

5-3-1 Vertical Locks

5-3-1-1 With power on

Using the vertical lock handle, release the electromechanical vertical locks, then verify that the carriage can move freely and smoothly over its entire range of travel with minimum side play.

If the carriage remains locked when the electromechanical lock is released, check the lock board feeding the electromechanical lock (see Table 1 below).

If carriage motion is not smooth and free, ensure that counterweights and trim covers are installed correctly. Add or remove counterweights until counterbalance is achieved.

Note: ***The carriage is counterbalanced on leaving the factory, however, if necessary add further counterweights to achieve the counterbalance.***

5-3-2 SG120 Buckyk Angulation

5-3-2-1 Angulation lock

Push one of the angulation lock push buttons behind the front panel to release the angulation lock. Verify that the angulation lock releases and that the Bucky can tilt forward 20 degrees and backward 90 degrees freely and smoothly (Illustration 5-11).

If angulation motion is not satisfactory, check the condition of the bearings at the Bucky pivot point in the Bucky support assembly.

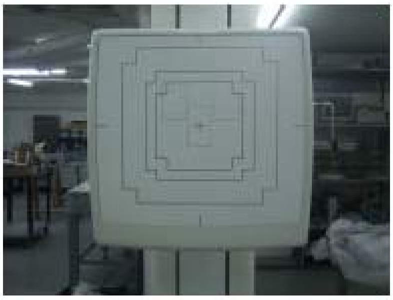
If the angulation lock does not release, check the lock board.

Release the angulation lock push button and verify that the angulation lock engages, preventing further angulation of the Bucky. If the lock does not hold or it binds, check the lock hardware for misalignment, wear etc... and perform the appropriate corrective action.

5-3-2-2 Micro switch Actuation

- Micro switch S1 should be actuated when the Bucky is within 10 degrees of vertical.
- Micro switch S3 should be actuated when the Bucky is within 10 degrees of horizontal.

Illustration 5-11



Bucky vertical (0 degree) position

Bucky Horizontal (90 degree) position

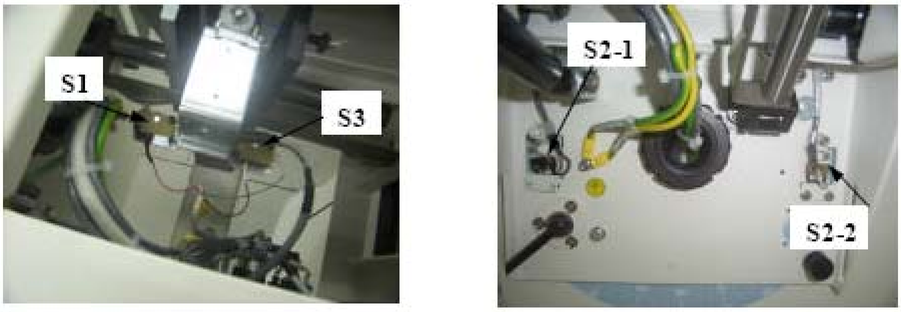
5-3-3 SG120 Bucky Rotation

5-3-3-1 Rotation Lock

With the rotation lock lever, release the rotational lock and verify that the Bucky can be easily rotated from 0 degrees to 180 degrees (upright to upside down, Illustration 5-12).
Re-apply the rotation lock and verify that Bucky rotation is not possible. If the lock does not engage properly, check the lock hardware for misalignment, wear etc... and perform the appropriate corrective action.

5-3-3-2 Micro switch Actuation

- Micro switch S2-1 should be actuated when the Bucky is at 0 degrees.
- Micro switch S2-2 should be actuated when the Bucky is at 180 degrees.


S1
S3
S2-1
S2-2

POSITIONS OF MICROSWITCHES S1, S2, S3

5-3-3-3 Rotation way check

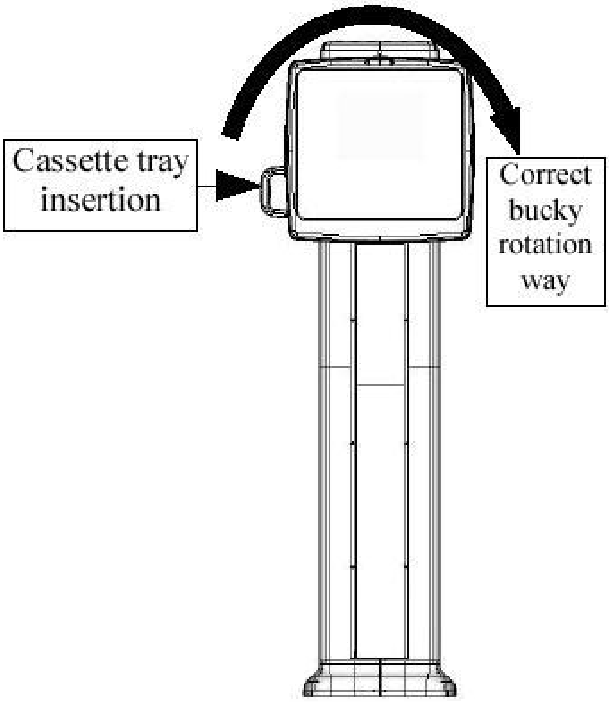

Cassette tray insertion
Correct bucky rotation way

Figure Left Configuration

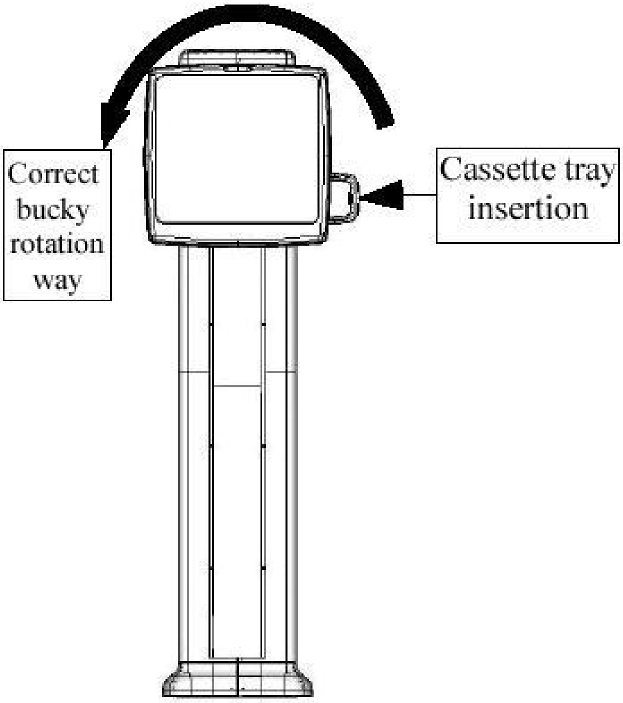
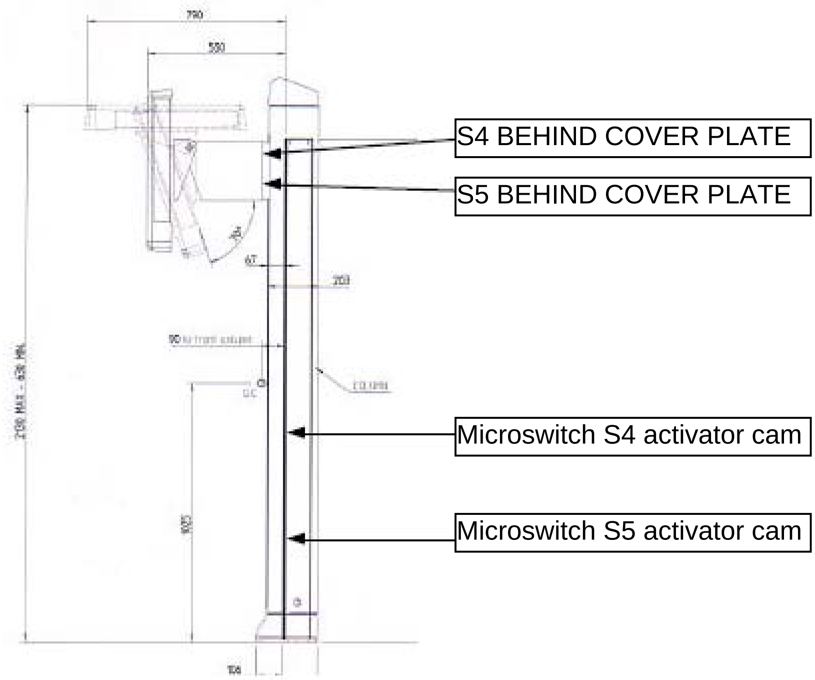

Correct bucky rotation way
Cassette tray insertion

Figure Right Configuration

Note: To realize a Right hand configuration and correct rotation way, please refer to IST009 of Bucky Reversal Procedure.

5-3-4 Vertical SID Points / Sittings Position

Rotate the Bucky to 0 degrees and angulate it to 90 degrees (horizontal). Verify that micro switch S5 is actuated when the Bucky is at the far vertical SID point.
Raise the Bucky and verify that micro switch S4 is actuated when the Bucky reaches the near vertical SID point (normally the point at which the Bucky front panel surface is at the same height as the table).



POSITIONS OF MICROSWITCHES S4, S5

5-3-5 Bucky Grid Check

Take an exposure with the vertical bucky stand selected.
The bucky grid should oscillate. Oscillation is distinctly audible and causes slight vibration of the bucky support assembly.
Observe the film for quality. If shading or objectionable grid lines appear, check alignment with the tube for proper local distance setting.

5-3-6 Control Board Check

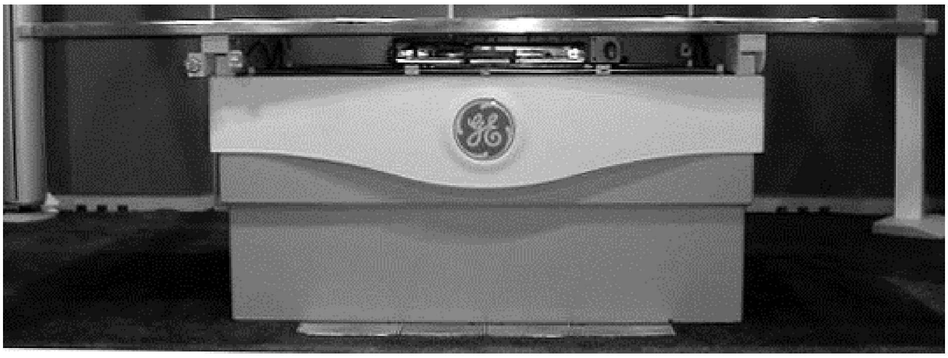
Check the control board only in the case of failure of the electromechanical locks. See Table 1 below for checks.

TABLE 1
LOCK BOARD FUNCTIONAL CHECKS

LOCK	FAILURE	CHECK
Vertical	Locks do not engage when equipment is switched on	24 VDC in D3 or Q2
	Locks remain engaged when operating lock handle	Handle switch
	Locks do not engage when releasing lock handle	Handle switch
Angulation	Locks remain engaged when operating lock handle	24 VDC in D3 or Q1/Q3

SECTION 6
CASSETTE TRAY

1. Confirm the pull-out and pull –in movement is smooth.
2. Pull out the cassette tray, insert a film cassette, then fasten the cassette lock. Check the cassette size displayed on OTS console and collimator is correct.
3. If not, see Chapter 3-“cassette size calibration”.



SECTION 7
OTS SUSPENSION

As part of the functional check of the Proteus XR/a system, also perform the functional checks for the OTS Suspension as found in the OTS Suspension Service Manual 2277285-100 chapter 3 Functional Checks.

SECTION 8
JEDI GENERATOR

PROTEUS XR/a (JEDI 50Plus R 1T & JEDI 80R1T)			**1/12**	**CHK JEDI 38-2**
subassembly: **Performance Checks**				
purpose:			*version no*. 0 *date:* **27/ 3/ 2000**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 35min***	

1 SUPPLIES

Not applicable.

2 TOOLS

Service tool.

KEITHLEY 35080A kV peak meter.

RADCAL MDH 2025 dosimeter with 20x5-60 probe.

3 SAFETY PRECAUTIONS

Standard precautions for work with ionizing radiation.

4 PREREQUISITES

All calibrations must have been completed.

5 GENERATOR PARAMETER ACCURACY

The precision of setting of all parameters (kVp, mA, exposure times, mAs) is checked, at variable settings of kVp, first in Three Point mode and then in Two Point mode.

Note: ***kVp values are measured using kV peak meter Keithley 35080A.***

5-1 Post Display

Values for mA, exposure times, and mAs are displayed on the CONSOLE after each exposure.

5-2 Accuracy Checks

5-2-1 Summary

Test exposures are made at specified settings, first in Three Point mode, then in Two Point mode, (without the use of AEC, Automatic exposure Control). The values of parameters read during the exposure are noted and compared with specified limits.

In each mode, exposures are made first with the small focal spot, then with the large focal spot, at kVp values of 60, 80, and 120 kVp.

In Three Point mode, each exposure is made at 20 mAs, and exposures are made with different values of mA and exposure time at each kVp value.

In Two Point mode, exposures are made with different values of mAs at each kVp value.

The parameters to be set for each exposure are specified in Illustrations 1, 2, 3, and 4 of this document.

5-2-2 Procedure

Refer to Illustrations 1, 2, 3, 4.

Make a series of exposures corresponding to the values specified in the tables, and note the actual parameters displayed for each exposure in the spaces provided.

For each parameter and each exposure, the tables specify acceptable high and low values.

CAUTION **The measurements of mA, mAs and ms must be made using the post display of the Service laptop. For kVp values, use the Keithley 35080A**.

5-3 Reproducibility and Linearity of exposures

5-3-1 Summary

Reproducibility and linearity are checked by making a series of exposures, measuring the actual dose produced in each case. The results are used to calculate coefficients of variation (C) and linearity (L).
Record values in Illustration 5.

Measurements are made using a RADCAL MDH 2025 dosimeter, with the probe (20x5-60) positioned at 100 cm (39 inches) from the focal spot.

CAUTION **The measurements of mAs must be made using the post display of the Console**

5-3-2 Reproducibility checks - Procedure

1. Position the probe as specified above.
2. Make ten exposures with the following conditions:
   - Three Point mode,
   - no AEC
   - Large focal spot
   - kVp 70 kVp
     exposure time 200 mS
     mA 100 mA

Note: ***Take care not to saturate the ionization cell. The maximum output dose permitted with the 20x5-60 probe is 3.3 mR/ms.***

3. For each exposure, note the measured dose (mR), and the mAs value shown on the POST DISPLAY in the space provided in Illustration 5.

5-3-3 Linearity checks - Procedure

1. Position the probe as specified above.
2. Make ten exposures with the following conditions:
   - Three Point mode,
   - no AEC
   - Large focal spot
   - kVp 70 kVp
     exposure time 200 mS
     mA 125 mA

Note: ***Take care not to saturate the ionization cell. The maximum output dose permitted with the 20x5-60 probe is 3.3 mR/ms.***

3. For each exposure, note the measured dose (mR), and the mAs value shown on the POST DISPLAY in the space provided in Illustration 5.

5-4 Coefficients of Variation and Linearity

5-4-1 Reproducibility - Coefficient of Variation C

The coefficient of Variation, C, is defined as:

$$C = \frac{1}{Rm}\sqrt{\sum_{i=1}^{n}\frac{(Ri - Rm)^2}{n-1}}$$

where:

R_i = dose measured during exposure i

R_m = average dose measured over ten successive exposures taken under the same conditions in less than an hour

n = number of exposures (ten)

Make the calculation and enter it into Illustration 5.

5-4-2 Coefficient of linearity L

The coefficient of Variation, L, is defined as:

$$L = \frac{Xm1 - Xm2}{Xm1 + Xm2} \qquad Xm1 = \frac{Rm1}{A1} \quad \text{and} \quad Xm2 = \frac{Rm2}{A2}$$

where:

R_{m1} = average dose measured over ten successive exposures taken under the same conditions (in particular with the same value of mA, here 100 mA), in less than an hour

R_{m2} = average dose measured over ten successive exposures taken under the same conditions (in particular with the same value of mA, here 125 mA), in less than an hour

A_1 = the mAs value used during the exposures used to measure R_{m1} (here 20 mAs)
A_2 = the mAs value used during the exposures used to measure R_{m2} (here 25 mAs)

Make the calculation and enter it into Illustration 5.

5-4-3 Acceptance Criteria

The results should give:

- Reproducibility C < 0.05
- Linearity L < 0.1

6 AUTOMATIC EXPOSURE CONTROL (AEC)

6-1 Reproducibility

Reproducibility is checked in Single Point, Two Point, and Three Point modes of operation. In each case, ten exposures are made and the doses are recorded. A coefficient of variation is calculated, as defined in section 5–4.

6-1-1 Two Point Mode

1. Select a workstation which uses AEC.
2. Select the large focal spot ▣.
3. Using two point mode, set the kVp to 120 kVp, mAs to 20 mAs.
4. Select the central measurement cell.
5. Center a phantom under the X-ray tube (10 to 20 cm (4 to 8 inches) of Plexiglass or water).
6. Center the probe (20x5-60) of a RADCAL MDH 2025 dosimeter 100 cm (39 inches) from the focal spot.
7. Make ten exposures. After each exposure note the dose (mR) in the space provided in Illustration 6.

Note: Take care not to saturate the ionization cell. The maximum output dose permitted with the 20x5-60 probe is 3.3 mR/ms.

6-1-2 Three Point Mode

Repeat the complete procedure specified above for Two Point mode, but use Three Point mode at 70 kVp, 250 mA, and 1000 ms.

6-2 Maximum mAs

This procedure checks the limitation on maximum mAs. When kVp is equal to or greater than 50 kVp, the mAs value should not exceed 600 mAs.

1. Select a workstation which uses AEC.
2. Select the large focal spot ▣.
3. Use Three Point mode, using values of 80 kVp, 160 mA, and 4000 ms (640 mAs).
4. Close the collimator.
5. Make an exposure.
6. Check that the exposure is interrupted after about four seconds; the buzzer should sound and the Inhibit indicator ⚡ should light.
7. Press the key on Service laptop to display the exposure parameters; check that the value for mAs is 600 mAs or less.

Pass ☐ Fail ☐

6-3 Minimum Exposure Time

This procedure checks that the minimum exposure time is less than 16 ms.

1. Select a workstation which uses AEC.
2. Select the large focal spot ▣.
3. Use Three Point mode, using values of 150 kVp, maximum mA, and 0.1 s.
4. Set the SID to approximately 1 m (39 inches).
5. Open the collimator.
6. Select each of the three measurement cell in turn. For each one:
   - Center the X-ray tube on the chosen measurement cell.
   - Make an exposure.
   - Press the key on Service laptop to display the exposure parameters; check that the value for exposure time is less than 16 ms.

Pass ☐ Fail ☐

PROTEUS XR/a	7/12	CHK JEDI 38-2

Illustration 1 - JEDI 50Plus R 1T Accuracy - Small focal spot - Radiography - 3 points - Tube:

mA	60 kVp			80 kVp			120 kVp		
	54.55 65.45	Data mA limits	Data ms limits	73.65 86.35	Data mA limits	Data ms limits	121.4 138.6	Data mA limits	Data ms limits
20	---	20 15.87 --- 24.12	1000 945 --- 1055	---	20 15.87 --- 24.12	1000 945 --- 1055	---	20 15.87 --- 24.12	1000 945 --- 1055
50	---	50 43.56 --- 56.44	400 377 --- 423	---	50 43.56 --- 56.44	400 377 --- 423	---	50 43.56 --- 56.44	400 377 --- 423
100	---	100 88.14 --- 111.86	200 188.18 --- 211.82	---	100 88.14 --- 111.86	200 188.18 --- 211.82	---	100 88.14 --- 111.86	200 188.18 --- 211.82
*160	---	160 140.64 --- 179.36	125 117.31 --- 132.69	---	160 140.64 --- 179.36	125 117.31 --- 132.69	---	160 140.64 --- 179.36	125 117.31 --- 132.69

*** for 50/65/80 kW only**

CAUTION

1- kVp values are measured using kV peakmeter Keithkey 35080A.

2- mA, time and mAs measurements must be made using the post display of Console.

PROTEUS XR/a	8/12	CHK JEDI 38-2

Illustration 2 - JEDI 50Plus R 1T Accuracy - Large focal spot - Radiography - 3 points - Tube:

mA	60 kVp			80 kVp			120 kVp		
	54.55 65.45	Data mA limits	Data ms limits	73.65 86.35	Data mA limits	Data ms limits	107.05 123.2	Data mA limits	Data ms limits
20		20 15.87 24.12	1000 945 1055		20 15.87 24.12	1000 945 1055		20 15.87 24.12	1000 945 1055
50		50 43.56 56.44	400 377 423		50 43.56 56.44	400 377 423		50 43.56 56.44	400 377 423
100		100 88.14 111.86	200 188.18 211.82		100 88.14 111.86	200 188.18 211.82		100 88.14 111.86	200 188.18 211.82
200		200 177.07 222.93	100 93.68 106.31		200 177.07 222.93	100 93.68 106.31		200 177.07 222.93	100 93.68 106.31
* 320 For 50/65/80 kW only		320 283.44 356.56	63 59.66 68.34		320 283.44 356.56	63 59.66 68.34		320 283.44 356.56	63 59.66 68.34
** 500 For 65/80 kW only		500 396.6 603.4	10 8.63 11.36		500 396.6 603.4	10 8.63 11.36		500 396.6 603.4	10 8.63 11.36
*** 630 For 80 kW only		630 502.9 757.14	10 8.63 11.36		630 502.9 757.14	10 8.63 11.36		630 502.9 757.14	10 8.63 11.36

PROTEUS XR/a	**9/12**	**CHK JEDI 38-2**

Illustration 3 - JEDI 50Plus R 1T Accuracy Small Focal spot - Radiography 2 points - Tube:

mAs	**60 kVp**	**80 kVp**	**120 kVp**
Displays	**mAs**	**mAs**	**mAs**
0.5	0.26 0.74	0.26 0.74	0.26 0.74
20	18.28 21.72	18.28 21.72	18.28 21.72
50	46 54	46 54	46 54

PROTEUS XR/a	**10/12**	**CHK JEDI 38-2**

Illustration 4 - JEDI 50Plus R 1T Accuracy Large focal spot - Radiography 2 points - tube:

mAs	**60 kVp**	**80 kVp**	**120 kVp**
Displayed	**mAs**	**mAs**	**mAs**
0.5	0.26 0.74	0.26 0.74	0.26 0.74
20	18.28 21.72	18.28 21.72	18.28 21.72
80	73.72 86.28	73.72 86.28	73.72 86.28

PROTEUS XR/a	**11/12**	**CHK JEDI 38-2**

Illustration 5 - Reproducibility and Linearity of Exposures in 2 points mode - Tube:

	70 kVp - 200 ms			
	20 mAs (100 mA)		**25 mAs (125 mA)**	
	mR (R_1)	**mAs (A_1)**	**mR (R_2)**	**mAs (A_2)**
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
Rm				
Xm				
C **(< 0.05)**				
L **(< 0.1)**				

Refer to section 5–4 for C and L calculation formula.

CAUTION **Measurement of mAs must be made using the post display of the Control Console.**

PROTEUS XR/a	**12/12**	**CHK JEDI 38-2**

Illustration 6 - AEC: Reproducibility of Exposures

MODE	**2–POINT**	**3–POINT**
	kVp =120 mAs = 20	kVp = 70 mA = 250 ms = 1000
DOSE	cGy (mR)	cGy (mR)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Rm		
C (< 0.05)		

Refer to section 5–4 for C calculation formula.

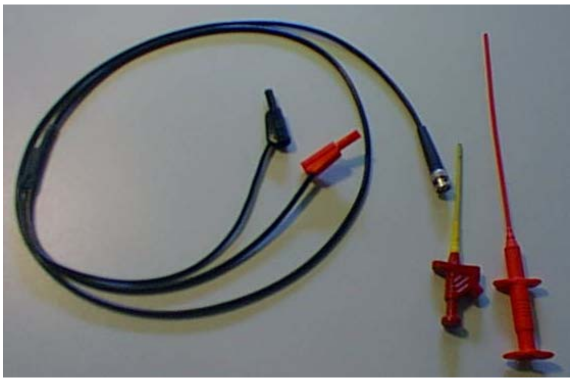
PROTEUS XR/a			**1/4**	**CHK JEDI 38-4**
subassembly: **Invasive mA Measurement**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 15min***	

1 SUPPLIES

Not applicable.

2 TOOLS

A multimeter and an oscilloscope with a filtering capability.



3 SAFETY PRECAUTIONS

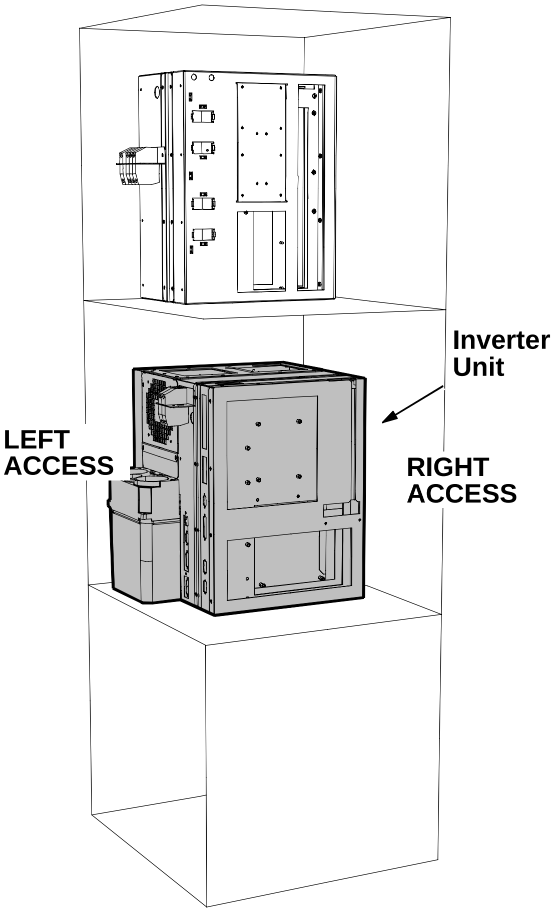
To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

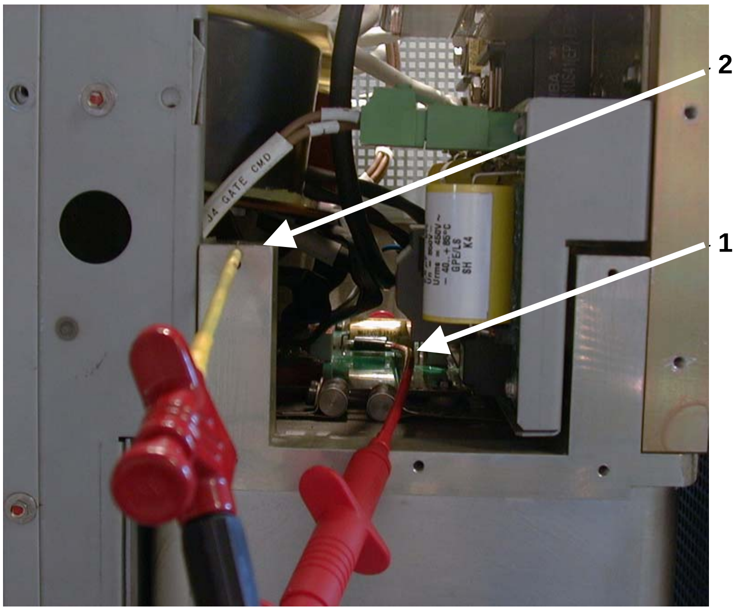
5 DISASSEMBLY

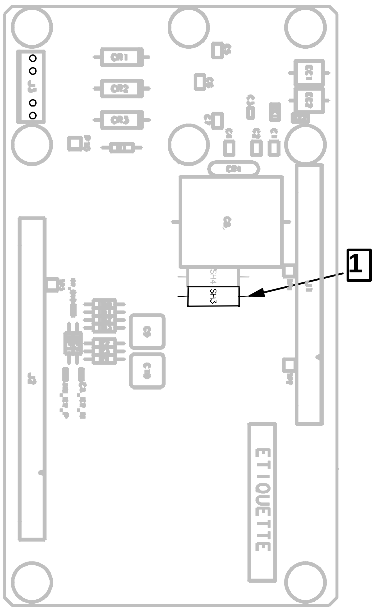
The Invasive mA Measure can be made on the both side of the Inverter Unit.


Inverter Unit
LEFT ACCESS
RIGHT ACCESS

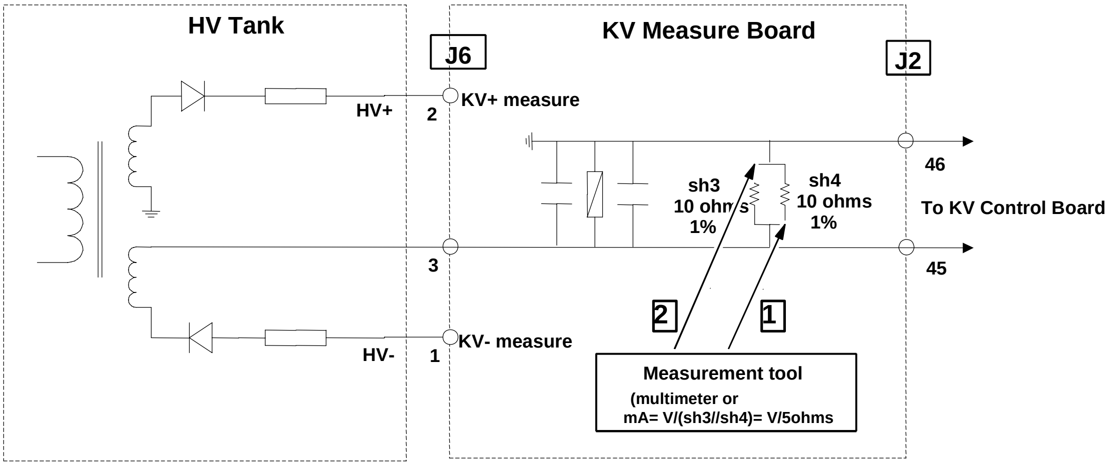
5-1 Disassembly - Right access

1. Remove the 5.5mm hex head screws which secure - the right cover of the Power Unit.
   Remove the cover.


2
1
J4 GATE CMD


CR1
CR2
CR3
SH3
1
ETIQUETTE

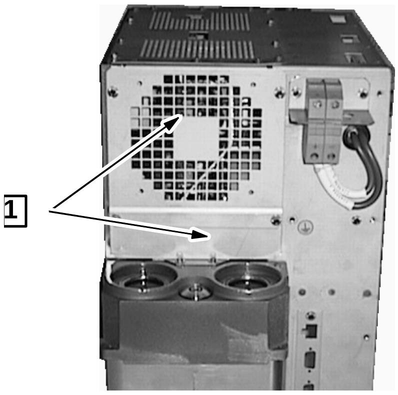
PROTEUS XR/a	3/4	CHK JEDI 38-4


HV Tank
KV Measure Board
J6
J2
HV+
2
KV+ measure
46
sh3
10 ohms
1%
sh4
10 ohms
1%
To KV Control Board
3
45
2
1
HV-
1
KV- measure
Measurement tool
(multimeter or
mA= V/(sh3//sh4)= V/5ohms

2. Put a probe inside the generator on the shunt SH3 (right side of the resistor) of KV Measure board on HV Tank ☐.
3. Connect a second probe on the mechanical ground ☐.
4. Check the resistor value with a multimeter: **it should be 5 ohms (+/- 0.05)**.

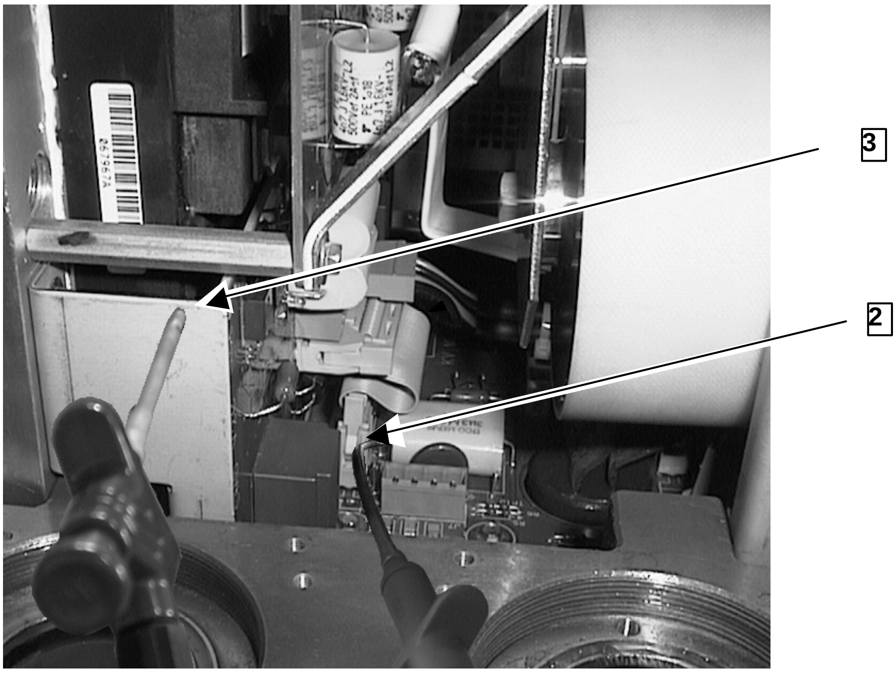
5-2 Disassembly - Left access

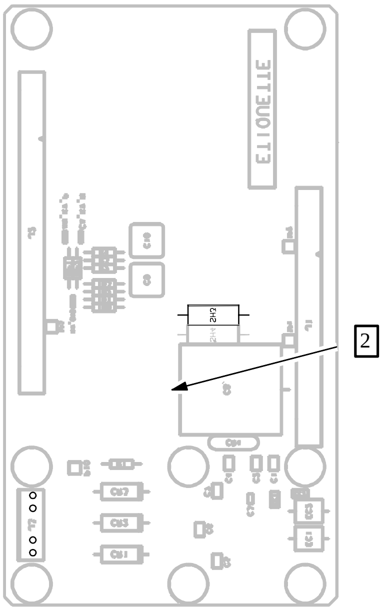
1. Unscrew the 5.5 mm screws securing the two EMC cover panels 1 at the HV connections side and remove them.

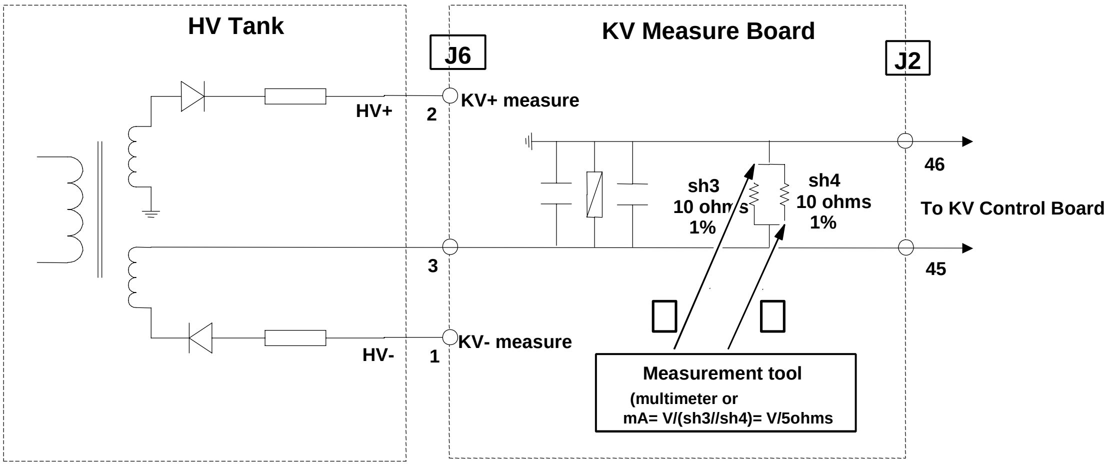


NOTICE

Take great care not to let screws fall into the HV connector receptacles. Cover them with plastic caps.






HV Tank
J6
KV Measure Board
J2
HV+
2
KV+ measure
46
sh3
10 ohms
1%
sh4
10 ohms
1%
To KV Control Board
3
45
KV- measure
HV-
1
Measurement tool
(multimeter or
mA= V/(sh3//sh4)= V/5ohms

2. Put a probe inside the generator on the shunt SH3 (right side of the resistor) of KV Measure board on HV Tank 2.
3. Connect a second probe on the mechanical ground 3.
4. Check the resistor value with a multimeter: **it should be 5 ohms (+/- 0.05)**.

6 mA MEASUREMENT

1. Power on the generator
2. Use a multimeter for mA <= 50 mA with a exposure time set to 1s minimum.
3. Use an oscilloscope for other mA, the signal must be filtered at f <= 10 kHz.

SECTION 9
ANODE HEAT INTEGRATOR FUNCTIONAL TEST

***Note:** The test is only for VA inquisition or customer requirements, or else, do not need implement it.*

1 TOOLS

- Proteus VA software site check tool (5241303)
- Service laptop with CD drive – service tools
- JEDI service software
- 9-wire serial cable

2 PROCEDURE

***Note:** Please follow the instruction in the Proteus VA software site check tool CD (5241303).*

CHAPTER 6 JEDI GENERATOR THEORY AND FUNCTIONAL DESCRIPTION

SECTION	Content	Version	Page
1	Theory of Operation	0	6-1
2	Theory Presentation	0	6-3

SECTION 1

THEORY OF OPERATION

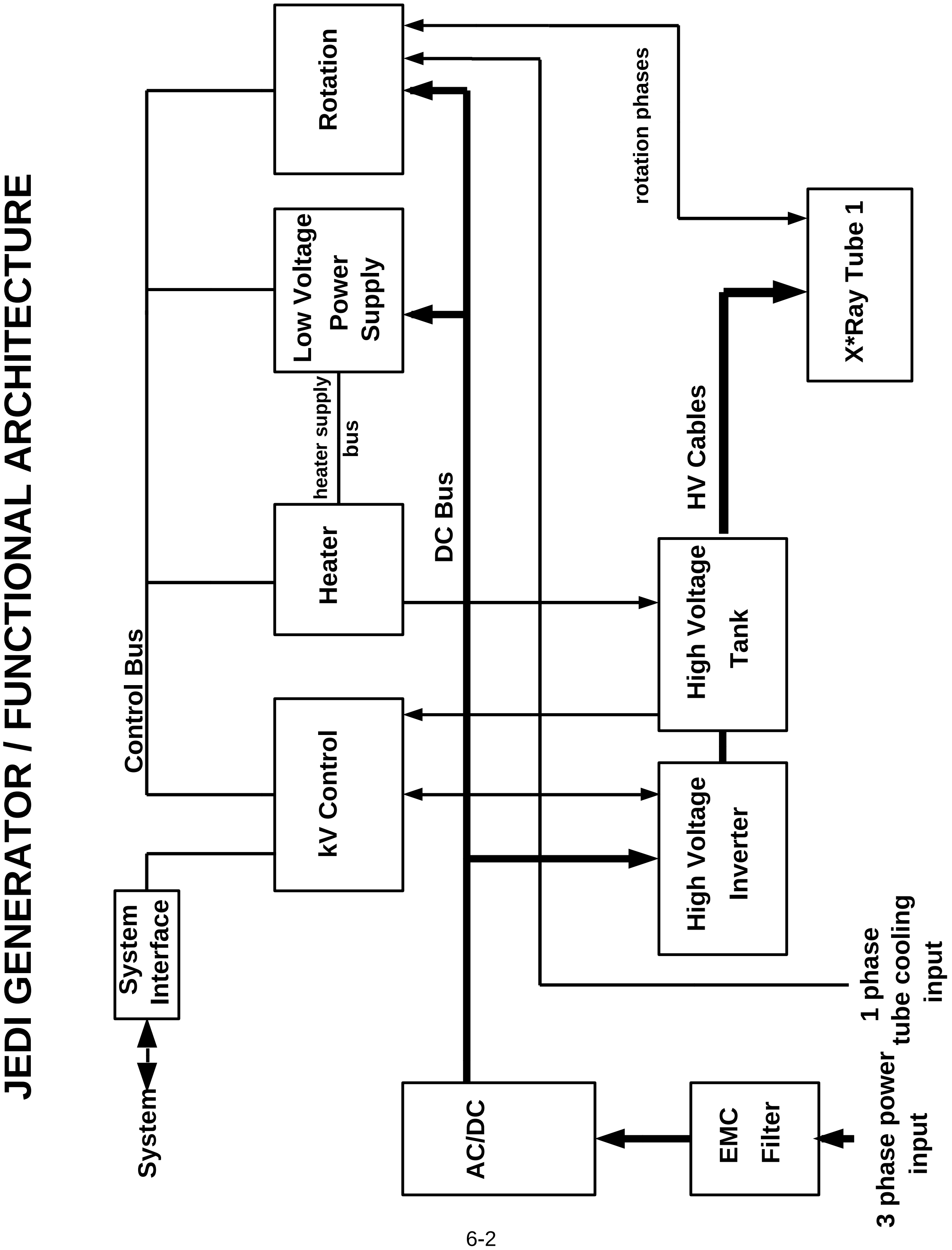
1-1 GLOSSARY

Glossary of terms used in this document:

Term	Definition
ABC	Automatic Brightness Control. Regulation loop which makes the measured brightness equal to brightness demand
AEC	Automatic Exposure Control. Exposure cut off technique which uses the brightness signal to cut the exposure
CAN	Controller Area Network. A network used for localized control.
CPU	Control Processor Unit. Microprocessor and peripherals which run the software/firmware
EPLD	Erasable Programmable Logic Device.
EMC	Electro Magnetic Compatibility. The EMC function prevents the generator from polluting the power source.
FPGA	Field Programmable Gate Array. It is programmed by the CPU core after the reset and handles all the exposure control logic including the system interface real–time lines.
HV Ripple	High voltage variations due to inverter current pulses. Typically a few percent.
State Machine	Software or hardware function which handles the state of a system and authorize to go to the next state upon reception of specific events.
IGBT	Insulated gate bipolar transistor. A type of power switch
I_{lp}	HV power inverter parallel resonant current; current in the parallel inductor
I_{lr}	HV power inverter serial resonant current; current in the serial inductor.
MOS	Metal Oxide Semiconductor. A type of power switch
OGP	On Gantry Processor. Unit which drives the generator in CT systems
PDU	Power Distribution Unit
RMS	Root Mean Square

1-2 JEDI HIGH LEVEL BLOCK DIAGRAM

Illustration 1 - Jedi Generator / Functional Architecture


JEDI GENERATOR / FUNCTIONAL ARCHITECTURE
Rotation
rotation phases
Low Voltage Power Supply
heater supply bus
Heater
kV Control
Control Bus
System Interface
System
DC Bus
AC/DC
EMC Filter
3 phase power input
1 phase tube cooling input
High Voltage Inverter
High Voltage Tank
HV Cables
X*Ray Tube 1

SECTION 2

THEORY PRESENTATION

2-1 INTRODUCTION

Jedi is the engineering name for a family of compact high frequency X-Ray generators. This generator family covers a wide range of applications from mobile equipment up to vascular systems:

- JEDI 12-25 kW: Mobile applications
- JEDI 24-48 kW: CT applications
- JEDI 32-50 kW: RAD applications
- JEDI 50-65-80 kW: RF applications
- JEDI 100 kW: VASCULAR applications

2-2 STANDARD FEATURES

Jedi is a family of 150 kV generators operating from 12 kW up to 100 kW for all the major radiological, fluoroscopic and CT applications. The family handles 1 ms to continuous exposures with tube currents ranging from 0mA up to 1000 mA.

The generators feature the very latest technology available:

- Constant potential independent of line voltage variations
- Power generation by a high-frequency converter (High voltage ripple: 40 kHz-140 kHz)
- Distributed micro-processor controlled functions (CAN bus)

Other features include:

- Single phase, three phase or battery power source
- Very low kV and mA ripple, excellent accuracies and dose reproducibility
- Compatible with a wide range of tubes, high speed or low speed, can supply up to 3 different tubes. Thermal load interactive integrator ensuring optimum use of the heat protection curve of the x-ray tube
- Available in various packaging configurations: gantry, under-table, cabinet
- Serviceability: high reliability, fast installation (no generator calibration), application error codes ensure fast troubleshooting
- Meets CE marking (and in particular EMC), IEC, UL, CSA, MHW regulations (if required)
- Optional pulsed fluoroscopy

2-3 APPLICATIONS

	RAD	Surgery	RF	Vascular/Cardiac	CT
3 Points Mode	x		x	x	
2 Points Mode	x		x	x	
1 Point Mode	x		x	x	
0 Point Mode			x	x	
AEC	x		x	x	
Tomography	x		x		
AET	x		x		
Continuous/Pulsed Fluoroscopy		x	x	x	
Rad Exposures		x			
Cinema 30 fr/s		x			
Cinema 90 fr/s				x	
ABC			x	x	
Variable mA Scans					x
Low mA Fluoroscopy					x

Legend:

- AEC - Automatic Exposure Control
- AET - Automatic Tomographic Exposure
- ABC - Automatic Brightness Control in fluoroscopy

2-4 ARCHITECTURE

Refer to Illustration 1: Jedi Generator / Functional Architecture

The Jedi family is composed of 3 elements:

2-4-1 A Kernel

- High voltage chain composed of kV control, HV power inverter and HV tank
- Anode rotation function
- Tube filaments heater function
- Control bus for communication between the functions
- DC bus for power distribution to each function
- Input voltage to DC conversion: AC/DC function
- Low voltage power supply
- Application software, running on the kV control board

These functions are the Jedi core. They are present in all versions of the generator.

A function can be unique for all products, or can have several different releases based on product specification.

Examples:

The anode rotation function is available in 2 releases:

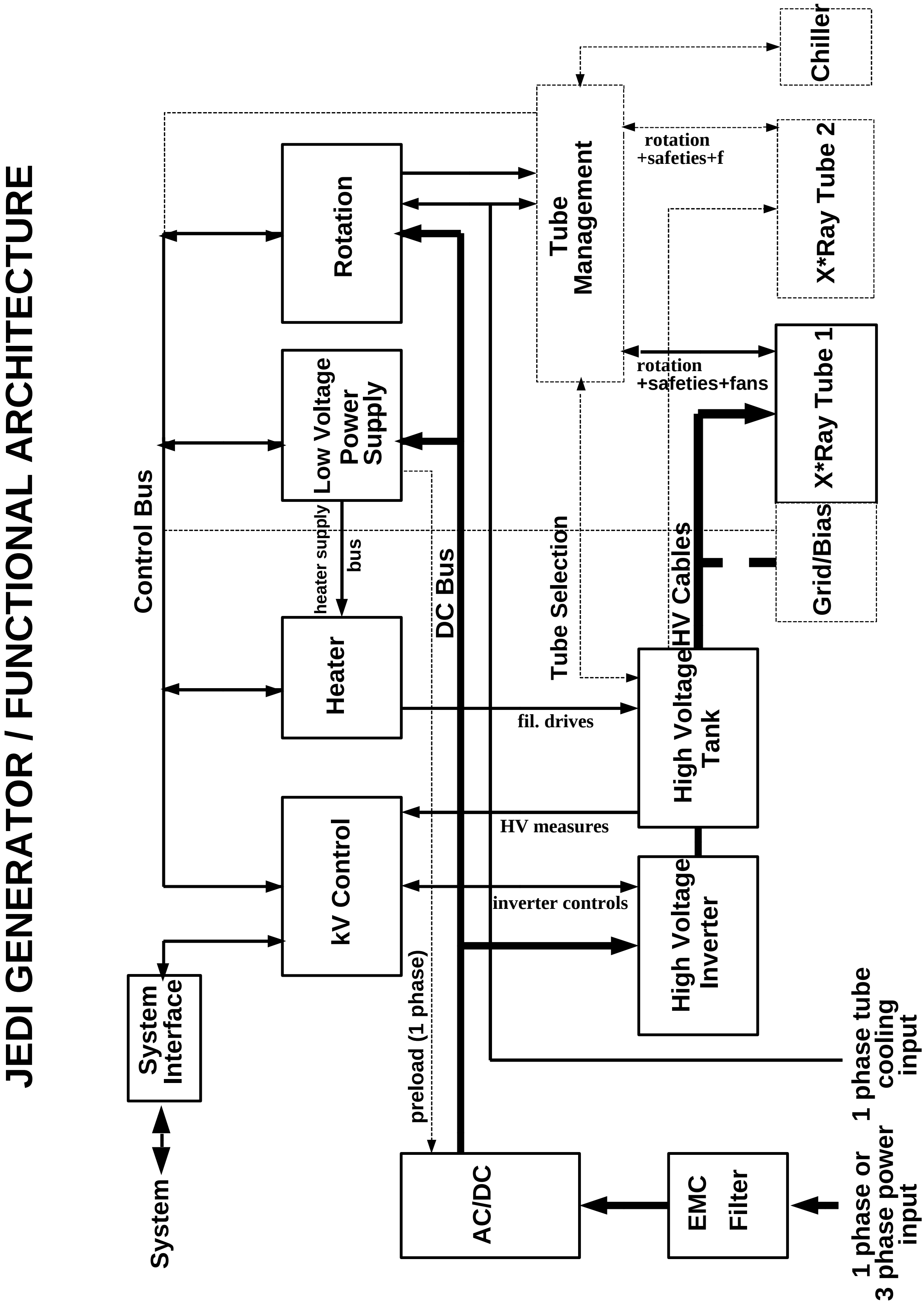
- low speed rotation for applications where the tube has a max rotation of 3000 rpm
- high speed/low speed rotation for applications where at least one of the tubes can use 8000-10000 rpm

The control bus is unique.

2-4-2 Options Depending on the Application

- A System Interface which can be:
  - CT interface
  - RAD interface (console interface, room interface, AEC management present or not)
  - ATLAS interface
- EMC function
- Grid function (RF, vascular)
- Bias function (RF, vascular)
- Tube management (2 tubes or 3 tubes option)

Illustration 2 - **Jedi Generator / Functional Architecture**


JEDI GENERATOR / FUNCTIONAL ARCHITECTURE
System
System Interface
Control Bus
Rotation
Low Voltage Power Supply
heater supply bus
Heater
kV Control
DC Bus
preload (1 phase)
AC/DC
EMC Filter
1 phase or 3 phase power input
1 phase tube cooling input
Tube Management
Tube Selection
fil. drives
HV measures
inverter controls
High Voltage Tank
High Voltage Inverter
HV Cables
Grid/Bias
X*Ray Tube 1
X*Ray Tube 2
Chiller
rotation +safeties+f
rotation +safeties+fans

2-4-3 A Packaging Architecture

The packaging architecture consists in a set of boxes which can be put together in several ways to make Jedi fit either in a cabinet, or a console foot, or a table foot. The boxes can also be split in 2 units distant of several meters (example: CT gantry). Refer to Illustration 3.

The boxes normally consist of the following:

2-4-3-1 Auxiliaries Box

- Rotation function
- Heater function
- Low voltage power supply (which can also be in the AC/DC box)

This box is always present.

2-4-3-2 Power Box

- HV tank
- HV power inverter
- kV control
- System interface (for the less complex system interface)

This box is always present.

2-4-3-3 AC/DC Box

- MC filter (optional)
- AC/DC function
- Low voltage power supply (which can also be in the auxiliaries box)

This box is always present.

2-4-3-4 System Interface Box

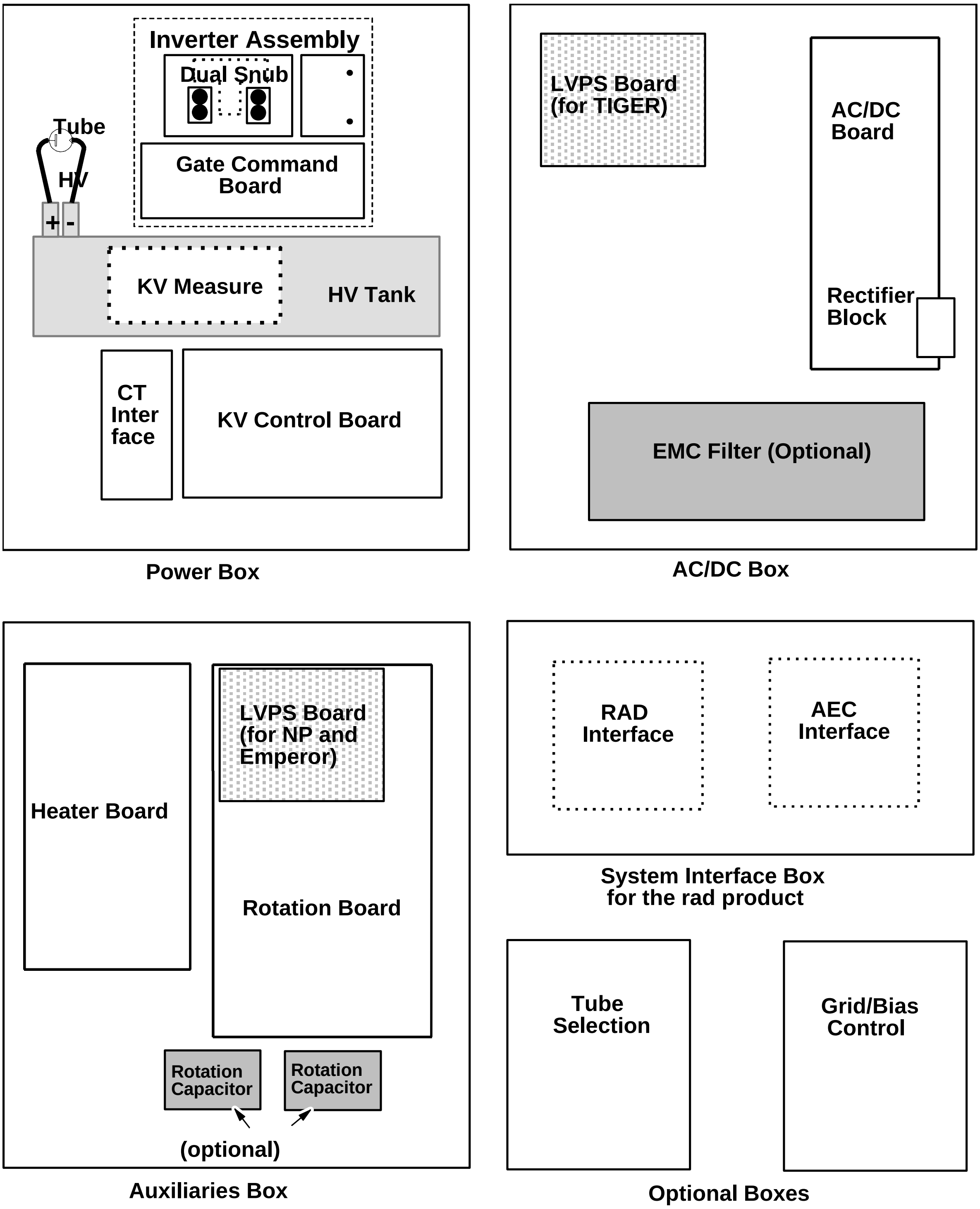
- RAD interface
- AEC interface

This box is present in the RAD product.

2-4-3-5 Optional Boxes

- Tube selection
- Grid/Bias control

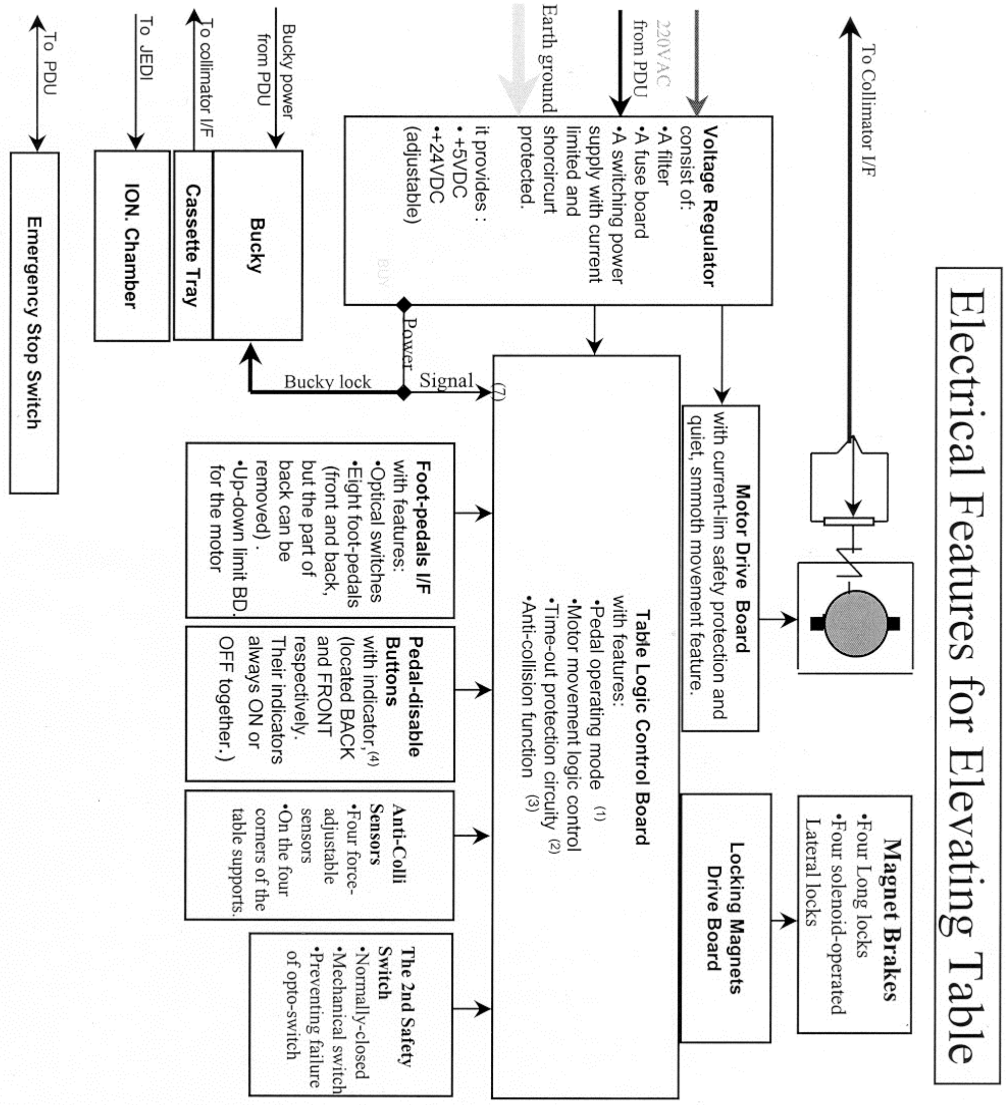
Illustration 3 - Jedi Generator / Packaging Architecture


Inverter Assembly
Dual Snub
Tube
HV
+
-
Gate Command Board
KV Measure
HV Tank
CT Inter face
KV Control Board
Power Box
LVPS Board (for TIGER)
AC/DC Board
Rectifier Block
EMC Filter (Optional)
AC/DC Box
Heater Board
LVPS Board (for NP and Emperor)
Rotation Board
Rotation Capacitor
Rotation Capacitor
(optional)
Auxiliaries Box
RAD Interface
AEC Interface
System Interface Box for the rad product
Tube Selection
Grid/Bias Control
Optional Boxes

CHAPTER 7 EXCEPTION HANDLING AND ERROR CODES

SECTION 1
TABLE

1-1 Theory of Operation


Electrical Features for Elevating Table

To Collimator I/F
Magnet Brakes
•Four Long locks
•Four solenoid-operated Lateral locks
Locking Magnets Drive Board
Motor Drive Board
with current-lim safety protection and quiet, smmoth movement feature.
Voltage Regulator
consist of:
•A filter
•A fuse board
•A switching power supply with current limited and shorcircurt protected.
it provides :
• +5VDC
•+24VDC (adjustable)
220VAC from PDU
Earth ground
Table Logic Control Board
with features:
•Pedal operating mode (1)
•Motor movement logic control
•Time-out protection circuity (2)
•Anti-collision function (3)
(7)
Signal
Power
Bucky lock
Foot-pedals I/F
with features:
•Optical switches
•Eight foot-pedals (front and back, but the part of back can be removed) .
•Up-down limit BD. for the motor
Pedal-disable Buttons
with indicator,(4) (located BACK and FRONT respectively. Their indicators always ON or OFF together.)
Anti-Colli Sensors
•Four force-adjustable sensors
•On the four corners of the table supports.
The 2nd Safety Switch
•Normally-closed
•Mechanical switch
•Preventing failure of opto-switch
Bucky power from PDU
Bucky
To collimator I/F
Cassette Tray
To JEDI
ION. Chamber
To PDU
Emergency Stop Switch

Note:

(1) All locks release with foot pedal depressing. Lat locks are power off locks, the Long locks are on whenever power to table is on and released when the table power is off. all locks should be inhibited when the table in motion.
Applying light foot pressure twice on the movement pedals activates the individual movement, preventing from accidental table lock release.
Note: an 45V rapid Circuit of about 100 ms for the lateral magnets' start-up

(2) if the moror is ever driven longer than 12 sec. 12 sec safety time-out circuity shuts off it, which doesn't happen under the normal circumstances.
Another one-minute safety time-out circuity is used for the locks.
Their time-set is adjustable.

(3) When occuring collision, downward movement will be disable until collision force is released.

(4) When depressing either of the two pedal-disable buttons, all locks pedals will be inhibited.

(5) The offset adjusting for the table SID is in Collimator I/F.

* Routing Power line in two ways: under floor for double side pedals, going backside for only fornt pedals.

1-1-1 System Operation

The table top floats or rides on eight ball bearing assemblies located inside the table top area. Each longitudinal bearing assembly consists of precision machined steel blocks with three (3) bearings bolted to each block assembly (totaling 12 ball-bearings for longitudinal table travel). Four linear bearings translate on hardened and polished steel shafts which permit transverse travel of the table top.

Four electro-magnets (24 VDC) are positioned extremely close to the rails that the bearings ride on. These magnets “grab” the steel rails securely, locking the longitudinal travel of the table. Four solenoid-operated fail-safe tilt locks are used to grab the transverse shafts, locking the transverse travel of the table. Depressing the four-way float pedal de-energizes the magnets and energizes the solenoids, allowing the table top to float freely.

The bucky housing assembly rides on four linear ball-bearings mounted to adjustable brackets attached to either side of the housing. These bearings travel on the hardened and polished steel shafts of the bucky carriage. One electro-magnet on the underside of the housing “locks” the bucky into place until the bucky lock release switch is depressed, thereby releasing the magnet’s hold and allowing free movement of the bucky.

1-2 Vertical Travel (for Hi-lo Elevating Tables Only)

Vertical table travel is performed by an electric reducer motor and a lead screw mechanism assembly inside the base.

1-3 Up-Down Motion Limitation (for Hi-lo Elevating Tables Only)

Limitation of travel for the scissor assembly is accomplished by a link connected to the scissors in such a way as to slide a flag along the Up/Down Limit Board until the flag breaks the beam in the opto-interrupter (either up or medium or down depending on direction of travel). The travel range is factory preset to 800mm table top to floor (upper limit) to 500mm table top to floor (lower limit).

1-4 Anti-collision (for Hi-lo Elevating Tables Only)

Anti-collision function is accomplished by four position switches. When a barrier stop table top downward motion, table top may produce some degree distortion. The position switch will work after the detector of position switches detect the distortion and prohibit the table motion.

1-5 Pedal Operation

1-5-1 Four-Way Tables

These tables have only one foot pedal (four-way float) which operates an opto-interrupter on the Lock Control Board.

1-5-2 Hi-Lo Elevating (Six-Way) Tables

The foot pedals have sheet metal tabs which ride in the open slot of the opto-interrupter (one for each pedal) so that when a pedal is depressed, the tab moves out of the beam of the opto-interrupter. The left four-way release, the Up pedal and the Down pedal, work on the Limit Board shared with the Up/Down limit switches. The right four-way release pedal has its own sense board. Both boards are plugged into the Six-Way Logic Board via plug-in cables.

1-6 SIX-WAY (HI-LO ELEVATING) TABLES

The table's major electrical components include the AC transformer and fuse block, printed circuit boards, magnetic locks and the associated wiring harnesses, the motor and the Up-Down Limit Board. It is suggested that you refer to chapter 10, Schematics, for the corresponding schematic diagram as you review this section.

1-6-1 Pedal Interface Board

There are two sub-boards:

- Pedal Board No.1

There are five opto-interrupters interfacing with the first lock-pedal, down-pedal, and up_lim-slider, down_lim-slider, respectively.

J3 and J4 for remote control (Optional), J2 connected to another Pedals I/F Board No.2, and J1 to Table Logic Control Board.

Jumper X1 is used for removing the Inhibition SW function for all pedals, and Jumper X2 only for adding the Inhibition SW function to the two Movement Pedals

- Pedal I/F Board No.2

The opto-interrupter Q1 is for the second lock-pedals.

1-6-2 Table Logic Control Board

J1 is connected to the power supply: J1-1 and J1-2 to +24vdc switching power supply, and J1-3 and J1-4 to the.

J2 is optional to the Tomo-link subsystem.

J3 and J4 are connected to front Pedal Interface Board and the back Pedal Interface Board respectively.

J5 is connected to lateral lock-magnets, longitudinal lock-magnets and Bucky lock-magnet.

J6-1 and J1-2 to the second safety mechanical switch, J6-3~6 to four anti-collision switches, J6-7 and J6-8 to the Inhibition Switches(the two is located on the front and back respectively), J6-11~14 to the lens on the Inhibition Switches.

J7 to the contactor &breaker for the AC motor.

- **The Double-click Function** (can be selected)

U1:A-U2:A, U1:B-U2:B, U5:A-6:A and related circuitry make up three Double-click Function circuitry, corresponding to the Up, Down and Lock pedals respectively. The jumper X1 and X2 are used for selection of the Single-click or/and Double-click Function on the movement pedals and locks pedals respectively. And the pedal actions have LED indicators.

- **The Protection Circuitry**

The U11:A used for inhibiting the simultaneity of the UP and Down.

The U11:B used for inhibiting the lock-pedal's activity as in motion.

U7 and its related circuitry form a Time Safety Protection circuitry (12 seconds, adjustable) for the motor.

U8 and its related circuitry is another Time Safety Protection (1 minute, adjustable) for the lateral lock-magnets.

- **Pedals Inhibition Function**(U15:A and its related circuitry)

There are two Pedals Inhibition Switches located on the front and back of the table respectively, which are non latching, momentary switches with indicator. The two indicators should always maintain the same status (ON/OFF) whenever depressing either of the two switch.

- **Anti-collision Function**

U13:A and its related circuit will this function.

- **The Second Safety Switch** (U13:B and related circuit)

- **Lock-magnets Driver Circuit**

  Q1(MTP3055) and its related circuit is used for lateral lock-magnets, and the +45VDC, diode D13(MBR1035), resistor R25 and capacitor E5(10000uF) build up a Rapid Circuitry about 100 milliseconds for the lateral magnet's start-up.

  Q2(MTP2955) and its related circuitry is to drive the longitudinal lock-magets.

- **Power Supply**

  1. +24VDC is supplied by a switching power supply with UL and EMC approved and can be adjustable in the range from 21VDC to 28VDC.
  2. +5VDC is supplied by the MAX726 and its related circuitry.
  3. +45VDC supplier circuitry consists of the transformer T1, bridge CR2, etc.

SECTION 2

JEDI EXCEPTION HANDLING

JEDI software performs auto-test at power up and continuously monitors the correct operation of its functions during application. Any malfunction is stored in the JEDI error log and reported to the system through a protocol that transports error code. Errors found can only be reported if the generator is powered on and live.

2-1 DIAGNOSTICS

There are different levels of diagnostics.

2-1-1 Power-on Diagnostics

At power-up the kV control performs its own initialisation, checks its memory integrity (checksum of program and NVRAM) and starts the communication with its peripherals as well as the system. Communication is permanently checked afterwards. It then initialises the Rotation board and Heater board with their respective database parameters and loads kV control FPGA.
Eight LEDs (S7..S0) on kV the control board show the software status.
During power-on, the Heater board and the Rotation board CPUs are initialised and check their memory integrity and hardware. If a problem is encountered, a PRD error is reported to the kV control.

2-1-2 Live Diagnostics

1. Under application. Faults will be reported through an error code and associated message. Some are straightforward and convey the root cause. Refer to the recommended action in the error list.

2. Diagnostics run separately:

- heating function
- rotation function
- inverter gate command diagnostic;
- inverter in short circuit diagnostic;
- no load HV fucntion diagnostics.

3. Manual Diagnostics

Through a troubleshooting guide based on an error message or when the generator does not reply.

2-2 ERROR CODE STRUCTURE

The error code structure described in this chapter applies to JEDI error detection and logging. The JEDI error log file can be accessed from the system through the system console or a laptop (JEDI error log upload functionality).
When an error is detected, it is sent to the system and is logged in parallel in the JEDI error log file. The file contains a maximum of sixty four logs.
Each log shows the following structure:

Simplified error code	Generator Phase	Error Class	Error Code	Data associated with the error code	Number of occurrences	Date & time

The fields are described in the following paragraphs.

2-2-1 Simplified Error Code Definition

The simplified error code is a grouping of the JEDI error codes. This field gives a rapid understanding of which part of JEDI is faulty.

Simplified Error Code	**Description**
30	Tube spits errors
40	Rotation errors
50	Heater errors
60	Exposure errors (HV inverter + mA measure + exposure control
70	Power supply errors (low voltage + DC bus)
80	Hardware errors (internal communications + cables)
90	Application errors (saved RAM + software)
100	External communication errors
110	Thermal errors
10	Rotation warnings (engineering use)
20	Heater warnings (engineering use)
25	LVPS warnings (engineering use)
27	Application warnings (mainly saved RAM battery change)

2-2-2 Generator Phase Definition

The generator phase field contains the state of the generator when the error occurred.

Generator Phase	Description
0	idle: entered in diagnostic mode
1	powered up; waiting for configuration
2	Stand by: configuration completed, waiting for a preparation
3	Preparation in progress: JEDI gets ready to take X-rays
4	Ready for exposures (rotation at speed; filament; HV inverter drive
5	High voltage on
6	Error detected and not yet cleared

2-2-3 Error Class Definition

There are five classes of errors that correspond to different levels of impact to the system. The class of errors correspond to the seriousness of the error and the system software will manage operations

Class	Description
1	Errors which have no impact on the system operation. Errors detected in background diagnostics during application. They are referred as ”Warning” errors, to monitor drifts and used for engineering tracking. The generator phase remains unchanged. Errors are stored in the JEDI error log.
2	Errors which are detected by JEDI and that are recoverable automatically without noticeable effect on the system, such as error related to recovered tube spits. The generator phase remains unchanged. Errors which usually occur during exposure.
3	Errors detected by JEDI during exposure. They stop the exposure and revert the generator into a safe state. Error will be reset on Exposure Command release. It will require another Exposure Command to restart the sequence. The generator phase is set to ”error” until the error is cleared.
4	Errors which are related to any hardware failures, software application or communication errors. JEDI will revert to a safe state. If preparation is in progress, it is stopped. Errors are cleared either by a reset error action from the system (for system having a reset error mechanism) or by a prep release or by a new prep command. The generator phase is set to ”error” until ther error is cleared. Application cannot work if errors are persistent.
5	These codes may appear when the generator or tube temperature limits are reached. The application waits until the thermal information disappears. The error information is temporary. The generator phase is set to ”error” until the error is cleared.

2-2-4 Error Code Definition

Each error code comprises two fields (which cannot be generated and used separately);

- the first field describes the JEDI function which is faulty (referred to as the function code)
- the second field describes the error detected.

Example: error code 0306 means:

- 03: high voltage generation function;
- 06: no kV feedback on anode.

Function Codes List

Function Code	Description
01	Rotation
02	heater
03	High voltage generation
04	mA control
05	Power supplies
06	System interface
07	Software
08	Application
09	Tube control
10	Tube management
11	Grid
12	Bias
13	AEC
14	Hardware

2-2-5 Data Associated with the Error Code

The field ”data associated with the error code” shows detailed information over the state of the generator when the error occurred.
Examples: rotation high speed acceleration state, small focus preheat, tube number 1 selected.

2-2-6 Number of Occurrences

The field ”number of occurrences” is used to log the same error occurring several times consecutively. Instead of filling the error log file with the same error which has occurred consecutively several times, the first error is logged and successive errors are recorded through increasing the ”number of occurrences” field.

2-2-7 Date & Time

The field ”date & time” stores the date and time when the error occurred. This is the JEDI internal date and time which may be different form the system date and time. In the case of logging the same error several times, the field indicates the date and time of the first occurrence.

SECTION 3
ERROR CODES, DIAGNOSTICS & TROUBLESHOOTING

3-1 INTRODUCTION

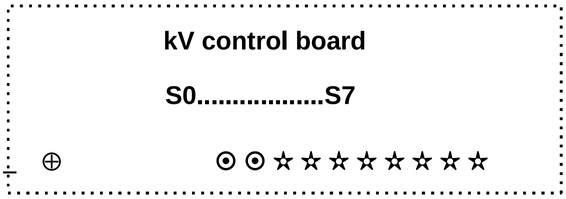
This diagnostics section is to introduce the JEDI generator with the following information:
Power-On diagnostics LED indication.
List all the potential error codes that can be issued by JEDI Generator.
Provide error code explanation, potential cause and recommended action.
List of diagnostics aids and explanation of diagnostics.
This section also includes the Collimator error codes.

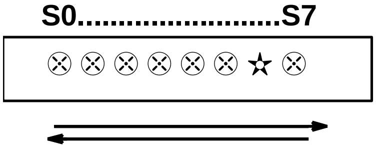
3-2 POWER ON DIAGNOSTICS

Refer to theory of operation for power-on sequence. This paragraph in this section is to provide meaning of boards' LED status. The LED display status is offering useful information at a glance to proceed to error code based troubleshooting. Whenever in doubt, a simple step is to watch the LED status display on the kV control board, than the Rotation and Heater.

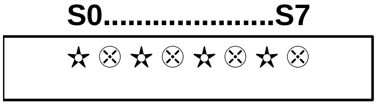
kV control LED status:

- During Power On Diagnostics :



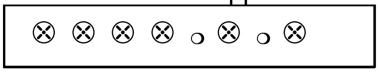


The 8 LED's (S0...S7) are lit successively in both directions (Scrolling as indicated by the arrows): the power up diagnostics are completed, kV control board is up and running.



One out of two is lit: Application (Flash) problem. Reloaded the APPL. mx file.

- When an application error occurs (Not PRD)



e.g: No communication

The simplified error code is displayed on the Leds. They blink; when the error is cleared (by a return to the standby mode for example), the 8 LEDs are lit successively.

Heater board LED status: (See central listing)

After the power on diagnostics, heater board LEDs DS1 and DS2 are lit successively. Any different status correspond to an abnormal situation. An error code is logged. Refer to error code description.

Rotation board LED status: (See central listing)

After the power on diagnostics, rotation board LED DS5 is blinking. Any different status correspond to an abnormal situation. An error code is logged. Refer to error code description.

3-3 ERROR CODE LIST

The error code list and associated short description is presented below.

Jedi generator error codes

simplified error code	Description	Error Class	Error Code	Description
30	**Tube Spits**	2	0301H	Tube spit (kV+ and kV- dropped)
		2	0302H	Tube spit (kV+ has dropped)
		2	0303H	Tube spit (kV- has dropped)
		2	0304H	Tube spit (kV regulation error)
		2	0305H	FPGA problem (restarting safety signal)
		2	0324H	SPITS(data=1:Anode,2:cathode,4:Both,8:kV regul)
40	**Rotation Error**	4	0101H	No CAN message received within 5 secs
		4	0102H	Database not correct
		4	0103H	Rotation current overload
		4	0104H	Rotation Openload
		4	0105H	Rotation Phases unbalanced
		4	0106H	Rotation Phases error
		4	0107H	Rotation Inverter permanent overcurrent
		4	0108H	Rotation command error
		4	0109H	MAINS_DROP has failed
		4	0110H	PRD error
		4	0111H	F0 main frequency problem
		4	0149H	Unknown Rotation error
50	**Heater Error**	4	0201H	No CAN message received within 5 secs
		4	0203H	Heater inverter permanent overcurrent
		4	0204H	Filament permanent open circuit
		4	0205H	Heater Inverter permanent short circuit
		4	0206H	Filament too high for Pre-heat
		4	0207H	Filament too high for Boost
		4	0208H	Filament too high for Heat
		4	0209H	Heater command error
		4	0210H	Current under estimated fork
		4	0211H	Current over estimated fork
		4	0212H	MAINS_DROP detected
		4	0213H	PRD error
		4	0214H	Stay too long in Boost
		4	0215H	Filament selection error
		4	0216H	Measured current while inverter OFF
		4	0221H 0222H 0223H 0224H	Filament Database not correct
		4	0248H 0249H	Unknown Heater error

simplified error code	Description	Error Class	Error Code	Description
60	**Exposure errors**	3	0306H	No kV Feedback on anode
		3	0307H	No kV Feedback on cathode
		3	0308H	No kV Feedback on anode and cathode
		3	0309H	kV detected during kV diag
		3	0310H	kV max detected
		3	0311H	ILP current not OK
		3	0312H	ILR current not OK
		3	0313H	ILR max current detected
		3	0314H	ILR current timeout
		3	0316H	Spit Max error
		3	0317H	Spit Ratio error
		3	0318H	kV did not reach 75% after 20ms
		3	0319H	kV unbalanced detected
		3	0320H	FPGA problem (safety signal)
		3	0321H	Spit retry failed
		3	0323H	ILP and ILR current not OK
		3	0401H	No mA feedback
		3	0402H	mA scale error
		2	0403H	mA accuracy exceeded 5%
		3	0504H	Inverter Gate Power Supply failed
		3	0801H	Exposure backup mAs exceeded
		3	0802H	Exposure backup time exceeded
		3	0803H	Exp cmd while gene not ready
		3	1411H	Time counter error
		3	1407H	mAs counter error
		3	1408H	AEC counter error
		3	1409H	mAs meter saturated
		3	1410H	FPGA Locked
		3	1420H	Tomo exposure cut by tomograph instead generator

70	**Power Supply errors**	4	0501H	DC bus out of range
		4	0503H	Inverter Gate Power Supply error
		4	0505H	Mains power supply has dropped during exposure
		4	0506H	DC bus 1 phase precharge error
		4	0507H	DC bus 1 phase discharge error
		4	0510H	AEC Cell HV supply error
		4	0549H	Unknown LVPS error
		4	0553H	Detected +160V too high
		4	0557H	Detected +160V too low
		4	0563H	Detected +15V too high
		4	0567H	Detected +15V too low
		4	0573H	Detected -15V too strong
		4	0577H	Detected -15V too weak

simplified error code	Description	Error Class	Error code	Description
80	**Hardware error**	4	0180H	Rotor board communication problem
		4	0181H	Rotor board has reset
		4	0280H	Heater board communication problem
		4	0281H	Heater board has reset
		4	0321H	kV conversion error
		4	0322H	kV ref ADC / DAC failed
		4	0601H	RTL error
		4	0602H	External CAN bus off
		4	0902H	tube Fan supply error
		4	1402H	Internal CAN bus off
		4	1403H	Connectic Fault
		4	1404H	FPGA configuration problem
		4	1405H	Tank sensor problem
90	**Application errors**	4	0701H	Saved RAM checksum pb
		4	0702H	Software problem
		4	0704H	Rotor/Heater hold too long
100	**Communication errors**	4	0603H	Debug screen com error
		4	0604H	Database download error
		4	0605H	TAV communication error
		4	0606H	MPC/Madrid communication error
		4	1301H	AEC communication error
110	**Thermal error**	5	0804H	Tank Thermal Error
		5	0903H	Tube exceeded 70degC
120	**Manipulation error**	5	1500H	Tomo brightness error
		5	1501H	Exposure switch released during exposure
		5	1502H	AEC cut off error
10	**Rotor Warning**	1	0151H	CAN Domain command number error
		1	0152H	CAN Domain request with no transfer init
		1	0153H	CAN Domain Toggle bit error
		1	0154H	CAN Domain : less than 2 data to download
		1	0155H	CAN Domain Abort received & applied
		1	0156H	Bad index in config upload
		1	0157H	Tube switch while rotor not off
		1	0158H	Acceleration cmd while no tube selected
		1	0159H	Acceleration cmd while database not OK
		1	0160H	Database download while rotor speeding
		1	0161H	Acceleration command not OK
		1	0162H	Rotor acceleration while in error

simplified error code	Description	Error Class	Error Code	Description
		1	0163H	No CAN message received within 4 secs
		1	0164H	Rotation Inverter overcurrent (< 3 times)
		1	0199H	Unknown rotation warning

20	**Heater Warning**	1	0251H	Received command is not OK
		1	0252H	Heater command not OK
		1	0253H	No CAN message received within 4 secs
		1	0254H	Heater inverter overcurrent (inverter1) (<3 times)
		1	0255H	Filament open circuit (inverter1) (<3 times)
		1	0256H	Heater Inverter short circuit (inverter1) (<3times)
		1	0257H	Tube switch while filaments not OFF
		1	0258H	CAN Domain command number error
		1	0259H	CAN Domain request with no transfer init
		1	0260H	CAN Domain Toggle bit error
		1	0261H	CAN Domain : less than 2 data to download
		1	0262H	CAN Domain Abort received & applied
		1	0263H	Database download while heater not cut
		1	0299H	Unknown Heater warning

25	**Low Voltage Power supply Warnings**	1	0550H	No more warn +160V too low or too gigh
		1	0551H	Detected +160V too high
		1	0555H	Detected +160V too low
		1	0560H	No more warn +15V too low or too high
		1	0561H	Detected +15V too high
		1	0565H	Detected +15V too low
		1	0570H	No more warn -15V too low or too high
		1	0571H	Detected -15V too strong
		1	0575H	Detected -15V too weak
		1	0599H	Unknown LVPS warning

27	**Application warnings**	1	1401H	Saved RAM power supply limit reached
		1	0703H	Watchdog reset has just occurred

Proteus XR/a Collimator error codes

Error Code	Description
Z00	RAM D1 error (fatal)
Z01	EEPROM D1 error (fatal)
Z02	CAN error (bus error, error overrun)
Z03	CAN error (receiver overrun)
Z04	No communication with D2
Z05	Calculation error - height
Z06	Calculation error - width
Z10	Stepping error - height leaves
Z11	Stepping error - width leaves
Z14	Limit switch - height leaves
Z15	Limit switch - width leaves

Eclipse Proteus Collimator error codes

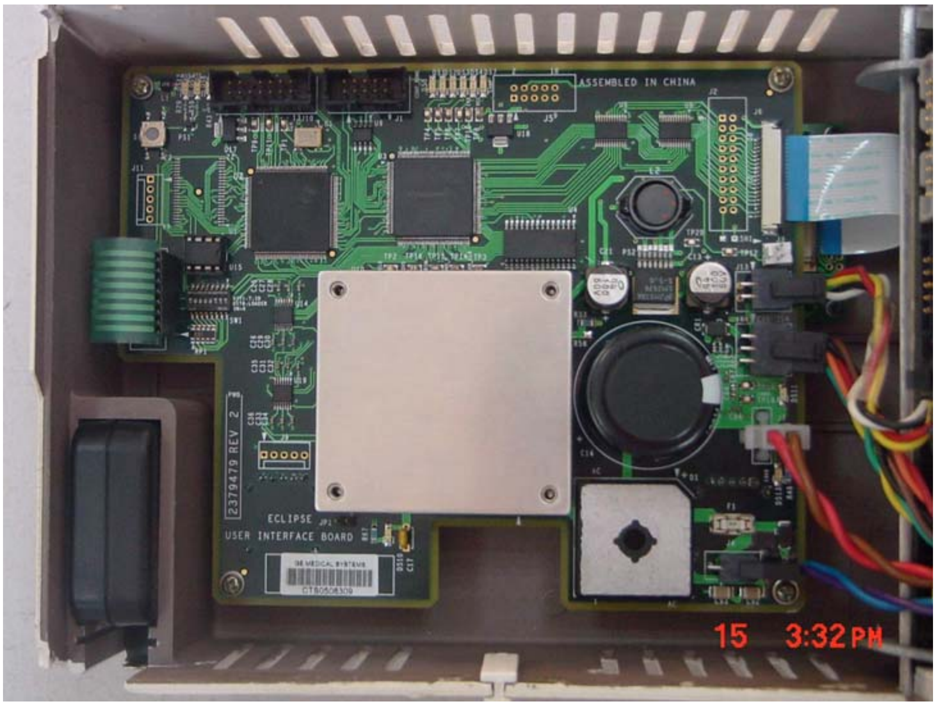
Error Code	Description	Recommended Reactions
Z00	Collimator UIF board error	Restart system; if fail again, Change UIF board
Z01	Collimator Control Board error	Restart system; if fail again, Change control board
Z02	Collimator Control board error	Dismiss the error, check the local connection cable
Z03	Collimator UIF Error	Dismiss the error, check the local connection cable
Z04	Collimator local communication error	Check the local connection cable, then restart system; if still fail, change the boards
Z05	Collimator LCD error	Change the LCD.
Z06	Collimator Blade out of limit	Restart the system.
Z10	Collimator internal error	Reset collimator; if fail again, change collimator
Z11	Collimator internal error	Reset collimator; if fail again, change collimator
Z14	Collimator Homing Error	Reset collimator; if fail again, change collimator

If the lamp cannot be switched on when push the lamp button on front panel, refer to the following trouble shooting.

1. Open the collimator front cover, assure stable cable connection on J4, J7 and J8 of user interface board.

2. Push ‘lamp’ button to light on lamp. Check the LED indicator status (DS7, DS10, DS13), as shown in following Figure

Indicator			Error	Recommended Reactions
DS13	DS10	DS7		
on	-	-	Lamp failure	Exchange lamp
off	on	on	UIF board failure	Exchange lamp
off	off	-	System lamp power failure	Check power supply unit on system side
off	-	off	UIF board or UIF panel failure	Exchange UIF board; if failure remains, change whole collimator



3-4 ERROR REPORTING

For Jedi generator error code, control console only displays the simplified error code from the Jedi generator.
Whenever a generator error is displayed on the operator console, the Jedi errorlog upload functionality is available to get more detailed information about the error.
This function must be performed from the service laptop.
The simplified error code must be used to find the Jedi error code in the Jedi errorlog file.
Having these two information, look at the Jedi trouble shooting table to find the FRU to replace.

For Collimator error code, refer to diagnostic section afterwards for potential cause and recommended action on Page 7-30

3-5 WARNING ERRORS

Warning errors are the result of automated and regular background monitoring for either software events or voltages threshold overtaking.
Those errors are merely for engineering usage and do not indicate any hardware error failure.
However, as they are logged into the Generator Err_log file, just as the previous list of error, they are listed here to help error sorting out.
Should too many of them are seen when viewing error log, it is advised to report them via CQA, since the equipment is still operating.

10	**Rotation Warning**	0151H	CAN Domain command number error
		0152H	CAN Domain request with no transfer init
		0153H	CAN Domain Toggle bit error
		0154H	CAN Domain : less than 2 data to download
		0155H	CAN Domain Abort received & applied
		0156H	Bad index in config upload
		0157H	Tube switch while rotor not off
		0158H	Acceleration cmd while no tube selected
		0159H	Acceleration cmd while database not OK
		0160H	Database download while rotor speeding
		0161H	Acceleration command not OK
		0162H	Rotor acceleration while in error
		0163H	No CAN message received within 4 secs
		0164H	Rotation Inverter overcurrent (< 3 times)
		0199H	Unknown rotation warning

20	**Heater Warning**	0251H	Received command is not OK
		0252H	Heater command not OK
		0253H	No CAN message received within 4 secs
		0254H	Heater inverter overcurrent (inverter1) (<3 times)
		0255H	Filament open circuit (inverter1) (<3 times)
		0256H	Heater Inverter short circuit (inverter1) (<3times)
		0257H	Tube switch while filaments not OFF
		0258H	CAN Domain command number error
		0259H	CAN Domain request with no transfer init
		0260H	CAN Domain Toggle bit error
		0261H	CAN Domain : less than 2 data to download
		0262H	CAN Domain Abort received & applied
		0263H	Database download while heater not cut
		0299H	Unknown heater warning

25	**Low Voltage Power Supply Warnings**	0550H	No more warn +160V too low or too high
		0555H	Detected +160V too low
		0560H	No more warn +15V too low or too high
		0561H	Detected +15V too high
		0565H	Detected +15V too low
		0570H	No more warn -15V too low or too high
		0571H	Detected -15V too strong
		0575H	Detected -15V too weak
		0599H	Unknown LVPS warning

27	**Application warnings**	1401H	Saved RAM power supply limit reached *This message is the result of a computation that is made by the software based on the Date for a period of approximately 7 years*

3-6 DIAGNOSTICS

This chapter describes diagnostics tools based on error codes and specific diagnostics.

WARNING

BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT-TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.

3-6-1 Detailed Error Description & Troubleshooting Guide

The first part details errors, while the warning errors are listed in a second part of this chapter.

The table below provides guidelines to troubleshoot Generator and Collimator problems based on error code.

For each code, there is:

-Associated message and additional explanation related to the error occurrence.

-List potential cause, in the order of expected probability.

Codes are sorted by ascending order both for simplified code and error code.

Refer to the theory of operation for error code structure for Generator error code.

Information about associated data structure is located at the end of each error code subset whenever it applies.

Whenever wiring, cabling, LED check is mentioned in the recommended actions, refer to the central listing.

3-6-1-1 Errors

Tube spits detection Errors (Code 30)

Class 2 Error code	Message/explanation	Potential cause
30-0301H	Tube spit (kV+ and kV- dropped) *kV drop/spit detected*	x-ray tube spit.
30-0302H	Tube spit (kV+ has dropped) *kV drop/spit detected on Anode side*	1. Anode side Tube spit. 2. Anode HV cable 3. HV tank
30-0303H	Tube spit (kV- has dropped) *kV drop/spit detected on cathode side*	1. Cathode side Tube spit. 2. Cathode HV cable 3. HV tank
30-0304H	kV regulation error *This is a slow speed safety circuit in case of “smooth” spits.*	1. smooth HV tube spits 2. kV control board (HV regulation problem) 3. too much line impedance 4. half of AC/DC capacitors open 5. Inverter (parallel inductor or filtering capacitors) 6. HV tank
30-0305H	Re-starting safety. (unknown reason) *Error occurring on safety line, while No root error present at the error inputs (Err 0301 to 0304). This is probably due to transient interference (Spikes).*	1. External unknown cause. 2. kV control board.

30- 0324H	*SPITS(data=1:Anode,2:cathode,4:Both,8:kV regul)*	1. Cathode spit if data =1/ anode spit if data=2 ,spits on both if data =4 Cathode/anode HV cable 2. HV tank 3. IF data=8 run diagnostic for error 0304H above

Anode Rotation errors (Code 40)

Class 4 Error code	Message/explanation	Potential cause
40- 0101H	No CAN message received within 5 sec's *The rotation board has not received any signal from the kV control main software for the last 5 sec., interpreted as a loss of communication*	1. kV Control main software lost 2. kV control or Rotation board driver failure 3. Bad contact on one of the pin on the CAN bus line connector
40- 0102H	Database not correct. *The firmware of the rotation board has detected that the Database received from the kV control board has wrong data.*	Wrong kV control Database. It can only happen at power up.
40- 0103H	Rotation current overload *Rotation board has detected Main or auxiliary rotation current too high compared to the max. Tube motor current.*	1. Rotation board 2. Wrong Database (improbable)
40- 0104H	Rotation current openload *Rotation board detected that no current is flowing to the motor.*	1. Tube stator winding is open circuit: x-ray tube 2. Incorrect wiring (Open) 3. No DC bus on Rotation board 4. Rotation board
40- 0105H	Rotation phases unbalanced *The amplitude difference of the current between main and auxiliary is too large.*	1. One rotation wire missing 2. Rotation board 3. Wrong tube configuration database
40- 0106H	Rotation phase error *The rotation board has detected that the current in the anode stator does not show the correct phase shift between main and auxiliary.*	Rotation board

Error code	Message/explanation	Potential cause
40-0107H	Rotation Inverter permanent overcurrent *An overcurrent has been detected and 3 restart have been tried unsuccessfully within a single rotation state*	1. Rotation board 2. Tube stator winding in short circuit -> x-ray tube 3. Wiring incorrect (shorted)
40-0108H	Rotation command error. *Rotation board has informed kV control board that the command was erroneous; this is a DEBUG error.*	No hardware failure
40-0109H	MAINS_DROP has failed *The firmware of the rotation board has detected the mains_drop signal activation and transmitted error to kV control*	1. Interference (spikes) 2. Mains drop 3. Cable or connector contact in DC bus between power unit and auxiliary unit 4. Rotation board
40-0110H	PRD error *Firmware checksum, RAM test and EPLD access are performed at power up or reset.*	Rotation board
40-0111H	F0 main frequency problem. *EPLD has not applied the inverter start command.*	Rotation board
40-0149H	Unknown Rotation error. *The main software received an error from rotation board with no error code associated.*	Software problem
40-111H	Error message from rotor firmware	Hardware/Software Conflict

Associated data structure:

PRD error:

component failure:
0001H=RAM
0002H=RAM stack
0200H=EPLD
8000H=program checksum

Rotation database error:

2 bytes data, each value points to a specific parameter found as being erroneous

other errors:

rotation state:
0=inverter OFF
1=acceleration 0 to low speed
2=acceleration 0 to high speed
3=acceleration low speed to high
4=low speed run
5=high speed run
6=high speed to low speed brake
7=brake reverse
8=brake DC

Filament Heater errors (Code 50)

Class 4 Error code	Message/explanation	Potential cause
50-0201H	No CAN message received within 5 sec's *The Heater board has not received any command from the kV control main software for the last 5 sec., interpreted as a loss of communication*	1. kV Control main software lost 2. kV control or Heater board driver failure 3. Bad contact on one of the pin on the CAN bus line connector
50-0203H	Heater inverter permanent overcurrent. (SW limit) *Issued by the heater board when an overcurrent has been detected and 3 restarts have been tried without success within 100 ms*	Heater board
50-0204H	Filament permanent open circuit. *Issued by the heater board when an open has been detected and 3 restarts have been tried without success within 100 ms*	1. X-ray tube filament open 2. Heater to HV tank cable 3. Cathode HV cable or pin contacts 4. Open circuit in filament transformer inside HV Tank.
50-0205H	Heater Inverter permanent short circuit (HW limit) *Issued by the heater board when a short circuit has been detected and 3 restarts have been tried without success within 100 ms*	Heater board
50-0206H	Filament current too high on inverter 1 for "Pre-Heat" *This is the result of an integrated value of the RMS current measurement on Heater board comparison with max. Tube value in Database.*	1. Tube Database or calibration 2. Heater board

Error code	Message/explanation	Potential cause
50-0207H	Filament current too high on inverter 1 for “Boost” *Same as above*	1. Tube Database or calibration 2. Heater board
50-0208H	Filament current too high on inverter 1 for “Heat” *Same as above*	1. Tube Database or calibration 2. Heater board
50-0209H	Heater command error *Heater board has informed kV control board that the command was erroneous; this is a DEBUG error.*	No hardware failure
50-0210H	Current under estimated fork/range *RMS filament current measurement (every 0.5 msec.) on heater board is too high*	Heater board
50-0211H	Current under estimated fork range *RMS filament current measurement (every 0.5 msec.) on heater board is too low*	1. Open circuit 2. Heater board
50-0212H	MAINS_DROP detected. *The firmware of the Heater board has detected the mains_drop signal activation and has transmitted error to kV control*	1. Interference (spikes) 2. Mains drop 3. Cable or connector contact in DC bus between AC/DC and auxiliary unit 4. Heater board
50-0213H	PRD error *Firmware checksum, RAM test and EPLD access are performed at power up or reset.*	1. Heater board 2. No -15V on Heater board
50-0214H	Boost too long on inverter 1. *Boost command stayed longer than 400 ms*	May be a loss of communication during boost.
50-0215H	Filament selection error. *The relay on the Heater board selecting the filament is in the wrong position with respect to the selection*	Heater board
50-0216H	Measured current while inverter OFF *Inverter current has been measured while the inverter was not commanded*	Heater board
50- 0221H 0222H 0223H 0224H	Filament Database not correct *The firmware of the heater board has detected that the Received Database from kV control contains erroneous data for Tube 1, 2, 3, or 4.*	Wrong kV control Database. It can only happen at power up.
50- 0248H 0249H	Unknown heater error *The main software received an error from heater board with no error code associated.*	Software problem.

Associated data structure:

PRD error:

component failure:
0001H=RAM
0002H=RAM stack
0200H=EPLD
8000H=program checksum

Filament database error:

2 bytes bitmap (LSByte=small focus, MSByte=large focus)
Each bit points to an erroneous parameter

other errors:

1 byte bitmap with the following structure:

bit7 (MSB)	bit6	bit5	bit4	bit3	bit2	bit1	bit0 (LSB)
focus selected	**tube selected**			**small focus state**		**large focus state**	
0=small focus selected 1=large focus selected	1=tube 1 selected 2=tube 2 3=tube 3 4=tube 4			0=inverter OFF 1=preheat 2=boost 3=heat		0=inverter OFF 1=preheat 2=boost 3=heat	

Exposure errors (Code 60)

Class 3 Error code	Message/explanation	Potential cause
60-0306H	No kV feedback on anode side *kV measured <12 kV 0,5 ms after start of exposure on anode side only*	1. HV cable short circuit 2. HV tank 3. kV control board (less probable)
60-0307H	No kV feedback on cathode side *kV measured <12kV 0,5ms after start of exposure on cathode side only*	1. HV cable short circuit 2. HV tank 3. kV control board (less probable)
60-0308H	No kV Feedback (on anode and cathode) *kV measured <12 kV 0,5 ms after start of exposure on both anode and cathode.*	1. HV tank 2. kV control board
60-0309H	kV detected during kV diagnostics. *KV measured during inverter diagnostics while no kV must be generated.*	Improper setup before the diagnostic is run.
60-0310H	kV MAX detected *kV reached 160 kV during exposure*	kV control
60-0311H	ILP current not OK. *The current in the parallel resonant circuit of the inverter did not rise at the beginning of the exposure.*	1. Inverter LC resonant circuit (Inverter coil assy, capa inverter assy.) 2. Inverter 3. kV control

Class 3 Error code	Message/explanation	Potential cause
60-0312H	ILR current not OK *The current in the serial resonant circuit of the inverter did not rise at the beginning of the exposure.*	See above
60-0313H	Inverter max. ILR current detected. *This is a hardware detection of maximum current in serial resonant circuit.*	1 HV tank 2 kV control
60-0314H	ILR Current time out. *The current resonant frequency is lower than expected*	1. kV control 2. Inverter 3. Current measurement circuit.
60-0316H	Spit Max error. *kV control has detected the number of tube spits during exposure has reached the limit (see theory of operation, software section)*	Reasonably x-ray tube
60-0318H	kV did not reach 75% after 20 ms. *Indicates that there were no HV ON signal generated for exposure time count-up*	kV control
60-0319H	kV unbalanced detected. *Detects that there is more than 12 kV difference between kV+ and kV -*	HV tank
60-0320H	FPGA problem; Safety hit with unknown reason *No error at the inputs while checking for error source.*	1. This may be due to transient interference (Spikes). 2. SW bug
60-0321H	Spit retry failed	Tube or HV cable
60-0323H	ILP and ILR current not OK *No inverter current measures at the beginning of the exposure*	1. Inverter LC resonant circuit. (Inverter coil assy, capa inverter assy, cabling) 2. Inverter 3. kV control board
60-0401H	No mA feedback *mA measurement function: kV control has detected no mA feedback 20 ms after the beginning of the exposure.*	1. HV tank 2. kV control board 3. x-ray tube (filament open)
60-0402H	mA scale error *mA has been measured to be either too low or too high with respect to mA demand 20 ms after the beginning of the exposure*	1. kV control board 2. default filament currents not correctly adjusted 3. HV Tank (improbable)

Class 3 Error code	Message/explanation	Potential cause
60-0403H (Class 2 error)	mA accuracy exceeded 5% *Measured mA every 50 msec exceeded 5% of mA demand. This error is logged, but does not stop the exposure.*	Tube spit
60-0504H	Inverter Gate Power Supply error *gate supply voltage has dropped below the level required to drive the IGBTs properly*	1. Inverter (gate command board) 2. kV control board 3. Generator input voltage too low or line impedance too high
60-0801H	Exposure backup mAs exceeded *The exposure command last so long that the maximum mAs allowed has been reached.*	1. Exposure command line stuck to the active state 2. kV control board 3. Heater board
60-0802H	Exposure backup time exceeded. *The exposure command last longer than the duration that was loaded by the system (Backup time + 5%.)*	1. System 2. System-Generator cable 3. I/F board: exposure line stuck to the active state
60-0803H	Exp cmd while gene not ready. *generator received an exposure command while not in ready state*	1. Software bug/problem 2. Cable / communication problem 3. External cause (Spikes)
60-1411H	Time counter error. *Error found in verifying the counter normal operation.*	kV control board
60-1407H	mAs counter error *Error found in verifying the counter normal operation.*	kV control board
60-1408H	AEC counter error *If there is no AEC feedback in AEC station exposure.*	1. ION chamber 2. AEC cable, connection 3. AEC board 4. kV control
60-1409H	mAs meter saturated. *A check is done on mAs counter operation at the beginning of exposure and found the mAs meter with unrealistic value.*	kV control
60-1410H	FPGA locked. *FPGA detected an error and did not allow start exposure after exposure command symbol was received*	1. Software problem 2. kV control
60-1420H	Tomo exposure cut by Tomography	Check the TOMO angle

Power supply (Code 70)

Class 4 Error code	Message/explanation	Potential cause
70-0501H	DC bus out if range (<400 or >850)	1. mains problem (Too low or too high) 2. One phase missing at Generator input
70-0503H	Inverter Gate Power Supply error (checked at prep)	1. Mains 2. Cable pb 3. Gate command board (Inverter) 4. kV control
70-0505H	Mains power supply has dropped During exposure	unknown
70-506H	DC Bus 1 phase precharge error	Not Proteus
70-507H	DC Bus 1 phase discharge error	Not Proteus
70-510H	AEC cell HV supply error	Power supply 230Vdc for AEC failed
70-0549H	Unknown LVPS error *The main software received an LVPS error with no error code associated.*	Software problem
70-0553H	Detected +160 V too high *+160 V is higher than 225 V (measured on heater board)*	1. LVPS 2. Heater board
70-0557H	Detected +160 V too low *+160 V is lower than 110 V (measured on heater board)*	1. LVPS 2. Heater board
70-0563H	Detected +15 V too high *+15 V is higher than 17.3 V (measured on heater board)*	1. LVPS open circuit 2. Heater board
70-0567H	Detected +15 V too low *+15 V is lower than 13 V (measured on heater board)*	1. LVPS open circuit 2. Heater board 3. rotation (short circuit) kV control (short circuit) (improbable)
70-0573H	Detected -15 V too high *-15 V is lower than -17.3 V (measured on heater board)*	1. LVPS open circuit 2. Heater board
70-0577H	Detected -15 V too low *-15 V is higher than -13 V (measured on heater board)*	1. LVPS (open circuit) 2. Heater board 3. rotation (short circuit) 4. kV control (short circuit) (improbable)

Hardware errors (Code 80)

Class 4 Error code	Message/explanation	Potential cause
80-0180H	Rotation board communication problem. *kV control board communication Watch Dog with Rotation board popped up because it did not get reply from Rotation board.*	1. Rotation board 2. Control bus cable 3. kV control
80-0181H	Rotation board has reset. *kV control has detected the Rotation board has reset. KV control will reload Rotation Database.*	1. Rotation board 2. Interference (Spikes)
80-0280H	Heater board communication problem *kV control board communication Watch Dog with Heater board popped up because it did not get reply from Heater board.*	1. Heater board 2. Control bus cable 3. kV control
80-0321H	KV conversion error *KV feedback measured while no KV generated*	KV control board
80-0322H	kV ref ADC / DAC failed *kV control DAC and ADC capability are permanently tested for coherency.*	KV control board
80-0601H	RTL error (+ associated data to check which of the 4 RTL lines) *Real Time Lines show a wrong state. RTL's are tested on a regular basis in stand by.*	1. system communication power supply (for isolated communications) 2. system communication cable 3. system interface board 4. system interface to kV control flat cable 5. kV control board
80-0602H	External CAN bus off	1. system communication power supply (for isolated communications) 2. system communication cable 3. system interface board 4. system interface to kV control flat cable 5. kV control board
80-0902H	Tube Fan supply error. *Rotation board has detected that a wrong voltage is applied to the tube fan*	1. No 115 V tube cooling supply 2. Rotation board

Class 4 Error code	Message/explanation	Potential cause
80-1402H	Internal CAN bus off *Can device on kV control board detected abnormal level on it's 2 line and sent error to the CPU*	1. kV control 2. Control bus cable 3. Heater or Rotation
80-1403H	Connection Fault *One of the flat cable connector is not connected in Generator.*	Multiple, but likely improbable.
80-1404H	FPGA configuration problem. *Detected during power up. The kV control main software cannot load the FPGA.*	kV control board.
80-1405H	Tank temperature sensor problem. *Means that t° value of the HV tank is < 10°C*	kV control HV tank

Application errors (Code 90)

Class 4 Error code	Message/explanation	Potential cause
90-0701H	NV RAM checksum pb. *Generator kV control board has detected corruption in the NV Ram verification (After power up)*	1. Database problem 2. External cause (Spikes) 3. kV control
90-0702H	Software problem.	1. Software or Database problem. 2. kV control board failure.
90-0703H	Watchdog reset has just occurred. *This error is logged when the CPU of the kV control board is reset by it's Watch Dog timer.*	1. Software or Database problem. 2. kV control board failure.
90-0704H	Rotation/Heater hold too long. *Will pop up if preparation command from the system is maintained longer than 3 minutes.*	Software problem.
90-0705H	Configuration error.	Software/hardware conflict.

Communication errors (code 100)

Class 4 Error code	Message/explanation	Potential cause
100-0603H	Debug screen com. error	Engineering use
100-0604H	Database download error *Generator has detected a problem during Database download*	1. Database file incorrect 2. Transmission problem
100-0605H	TAV communication error. *Generator has detected a communication problem between the I/F and the service laptop (When generator is controlled by the laptop)*	1. Software / laptop problem 2. Cable problem
100-0606H	MPC/Madrid Communication error. *No reply from the console. (This error message can be seen using the service laptop)*	1. Cable, connection problem between Generator and the console. 2. Interface board 3. kV control board 4. Cabling between kV control board and IF board 5. Console problem **Not Proteus**
100-1301H	AEC communication error *KV Control has detected a communication problem with AEC board.*	1. AEC board 2. I/F board 3. kV control 4. Wiring

Thermal errors (code 110)

Class 5 Error code	Message/explanation	Potential cause
110-0804H	Tank Thermal Error *HV tank temperature measurement has reached 60 degree C*	1. HV tank too hot; normal error 2. HV tank 3. kV control
110-0903H	70 degree C thermal safety error *70° loop detected open*	1. X-ray tube too hot; normal error 2. Wiring problem 3. Sensor problem (Tube) 4. rotation board

Thermal errors (code 120)

Class 5 Error code	Message/explanation	Potential cause
120-1500H	Tomo brightness not good	Technics (kV,mA) not set at the correct value. The brightness signal is out of range (+/-20%)
120-1501H	Exposure switch released	Handswitch has been released before the end of exposure
120-1502H	AEC CUT off error	Backup time or mAs too short; AEC did not cut the exposure

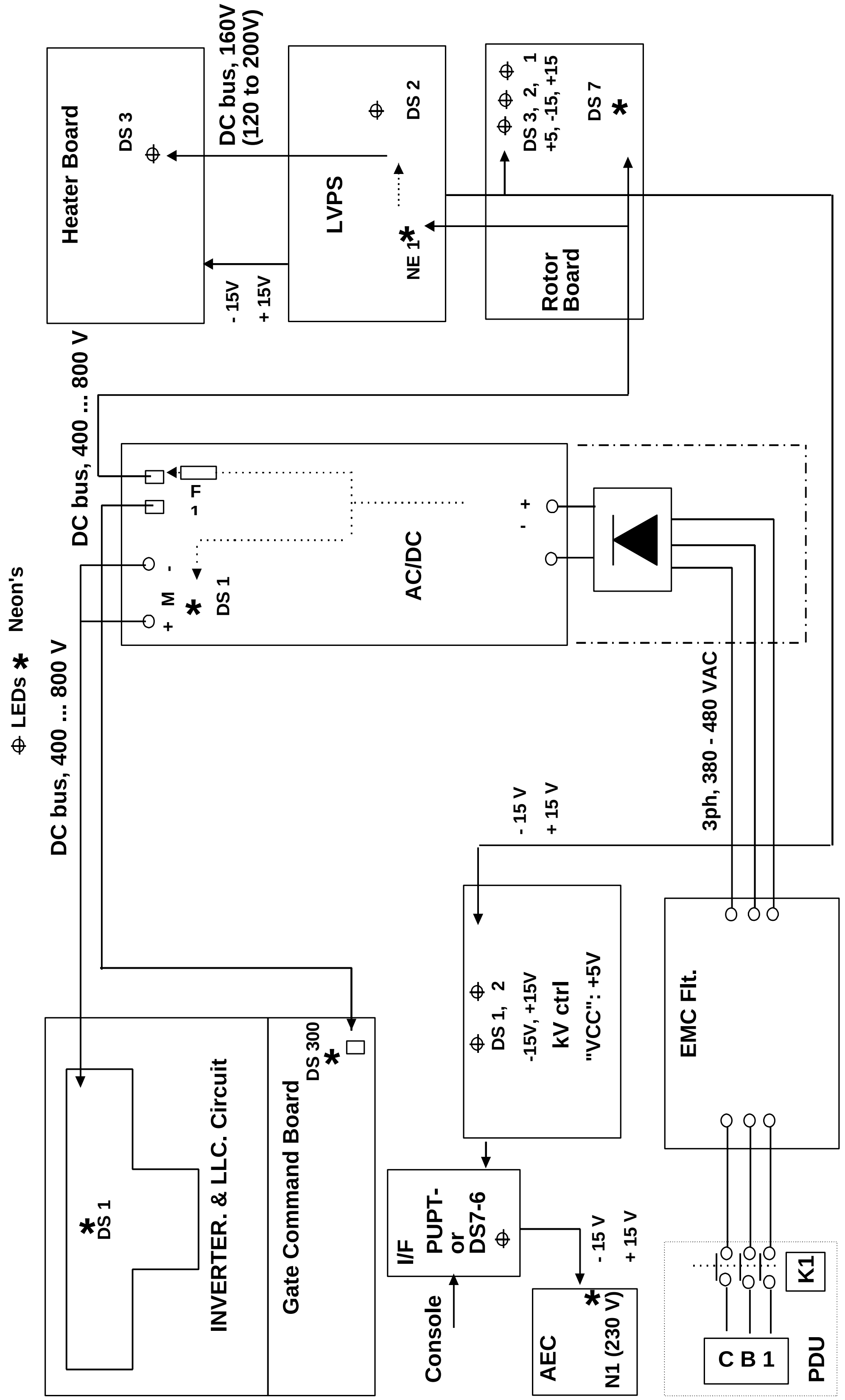
Proteus XR/a Collimator errors

Error Code	Description	Potential cause and recommended action
Z00	RAM D1 error (fatal)	Reboot System; If the error still occurs, change D1 board
Z01	EEPROM D1 error (fatal)	Reboot System; If the error still occurs, change D1 board
Z02	CAN error (bus error, error overrun)	Check CAN cabling (data, voltage) and CAN termination
Z03	CAN error (receiver overrun)	Check CAN cabling (data, voltage) and CAN termination and if heavy traffic on the CAN bus
Z04	No communication with D2	Reboot System; If the error still occurs, change D2 board
Z05	Calculation error - height	Reboot System; If the error still occurs, change collimator
Z06	Calculation error - width	Reboot System; If the error still occurs, change collimator
Z10	Stepping error - height leaves	Observe the error; if it occurs always again in shorter time intervals, change collimator
Z11	Stepping error - width leaves	Observe the error; if it occurs always again in shorter time intervals, change collimator
Z14	Limit switch - height leaves	Reboot System; If the error still occurs, change collimator
Z15	Limit switch - width leaves	Reboot System; If the error still occurs, change collimator

Eclipse Proteus Collimator errors

Error Code	**Description**	**Recommended FE Actions**
Z00	Collimator UIF board error	Restart system; if fail again, Change UIF board
Z01	Collimator Control Board error	Restart system; if fail again, Change control board
Z02	Collimator Control board error	Dismiss the error, check the local connection cable
Z03	Collimator UIF Error	Dismiss the error, check the local connection cable
Z04	Collimator local communication error	Check the local connection cable, then restart system; if still fail, change the boards
Z05	Collimator LCD error	Change the LCD.
Z06	Collimator Blade out of limit	Restart the system.
Z10	Collimator internal error	Reset collimator; if fail again, change collimator
Z11	Collimator internal error	Reset collimator; if fail again, change collimator
Z14	Collimator Homing Error	Reset collimator; if fail again, change collimator

Illustration1 - GENERATOR Visual Power Supply Distribution


Heater Board
DS 3
DC bus, 160V (120 to 200V)
- 15V
+ 15V
LVPS
DS 2
NE 1
Rotor Board
DS 3, 2, 1
+5, -15, +15
DS 7
DC bus, 400 ... 800 V
AC/DC
F 1
+
-
M
DS 1
⊕ LEDs ✱ Neon's
DC bus, 400 ... 800 V
3ph, 380 - 480 VAC
- 15 V
+ 15 V
DS 1, 2
-15V, +15V
kV ctrl
"VCC": +5V
EMC Flt.
INVERTER. & LLC. Circuit
DS 1
Gate Command Board
DS 300
I/F
PUPT- or DS7-6
Console
- 15 V
+ 15 V
AEC
N1 (230 V)
K1
C B 1
PDU

3-7 OTHER FAILURES

Error code	Message / explanation	Potential cause	Recommended action Troubleshooting guide
System	**GENERATOR does not reply to the system**	1. No power on the Generator 2. EMC filter 3. AC/DC- Diode bridge 4. Cable between AC/DC and LVPS 5. LVPS down 6. CAN cable problem 7. kV control 8. RAD interface 9. AEC board 10. Rotation board 11. Heater board 12. Inverter in short circuit 13. Generator to system cable	Perform the troubleshooting in the following way: 1/ kV control Leds S0-S7 are lit successively: refer to system communication errors (code 06xx H) 2/ Leds S0-S7 show a specific pattern: refer to PRD errors section 3/ Led RESET is lit: board is maintained in reset either by the system or by a system I/F failure or kV control failure 4/ Led HALT is lit: replace kV control 5/ No Led is lit: verify that +5 V on kV control board (J6, pin 2).is present. If yes, replace kV control. If no: 6/ Verify if +15 V/-15 V is present (Leds DS1/DS2). **If yes:** Verify that mains_drop line is not stopping the kV control software (mains_drop active): 6-1/ Check if DS1 LED on LVPS board is lit. If yes, replace LVPS board. 6-2/ Disconnect Heater board control bus cable. Check if kV control software starts. If yes, replace Heater board. 6-3/ Disconnect Rotation board control bus cable and connect it directly to LVPS board. Check if kV control software starts. If yes, replace rotation board. 6-4/ If AEC existing, disconnect AEC cable (J5) from IF board (J3) cable. Check if kV control software starts. If yes, disconnect AEC chambers and connect AEC board to IF board. If kV control starts, check AEC chambers, else replace AEC board. 6-5/ Disconnect IF board cable (J10). Check if kV control software starts. If yes, replace IF board, else: replace kV control board. **if no:** 7/ Verify if +15 V/-15 V is present on rotation board (DS1/DS2) and the 160 V is present on the heater board (DS3). If yes: check the control bus cable to the kV control board. If no error, change the kV control board. If no:

Error code	Message / explanation	Potential cause	Recommended action Troubleshooting guide
	GENERATOR does not reply to the system (Cond‘t)		8/ Verify if the LVPS DC input is right. If no, check AC/DC fuse and input line If yes: 9/ disconnect all output cables from the LVPS board. Verify the +15 V/-15 V/160 V output. If right: reconnect each board successively to find the one stucking the 15V to ground. If wrong, replace LVPS board
	3 phases CB1 breaker trips in PDU or AC FUSES blown	1. Short circuit on Generator: - IGBT in short circuit - ACDC or bridge rectifier in short circuit - EMC filter in short circuit	1/ Disconnect DC bus cables between AC/DC and inverter (on AC/DC side) 2/ Check if these cables are in short circuit. If yes, replace inverter if no, 3/ Remove ACDC board 4/ Check between outputs pins then between inputs of ACDC board. If short circuit, replace AC/DC FRU if no: 5/ Check bridge rectifier, between outputs, if yes, replace ACDC FRU (including rectifier bridge) if no: 6/ Check bridge rectifier, between inputs, if yes, replace ACDC FRU (including rectifier bridge) if no: 7/ Disconnect AC line input from EMC board. Check EMC for short circuit between phases. If short circuit, replace EMC board.
	Software or Data base corrupt	1. After software download: - Incorrect or uncompleted download - Checksum problem	Retry download

3-8 HEATING FUNCTION DIAGNOSTICS

Purpose:

The purpose of this test is to drive the heater inverter(s) on both filaments and all the tubes connected to the Generator in order to identify a faulty heater FRU or a wrong connection between heater board, HV Tank and tube(s).

Pre-requisites:

- kV control board alive and running: S0-S7 Leds are lit successively or a combination of them blink
- heater board alive and running: DS1 and DS2 Leds are lit successively
- heater DC supply present: DS3 Led is lit

Test type: No manual interaction

Sequence:

Select the tube to run the test on, start the diagnostic.
The following sequence runs on the small focus and then on the large focus:

- 5 seconds preheat
- 0,4 s boost
- 5 s heat (focal spot max current - 1Amp)

There is 10 s stop time between each focal spot run
During the test, the heater safeties are checked the same way than in application mode.

Error codes reporting:

Refer to the troubleshooting table.

3-9 ROTATION FUNCTION DIAGNOSTICS

Purpose:

The purpose of this test is to drive the rotation inverter(s) in high speed mode (for application supporting high speed mode) and low speed mode on all the tubes connected to the Generator in order to identify a faulty rotation FRU or a faulty dephasing capacitors FRU or a wrong connection between rotation board and tube.

Pre-requisites:

- kV control board alive and running: S0-S7 Leds are lit successively or a combination of them blink
- rotation board alive and running: DS5 Led blinking
- rotation DC supply present: DS7 neon is lit
- cabling between rotation board and tube checked

Test type:

No manual interaction, no loop on

Sequence:

Select the tube to run the test on, start the diagnostic.
The following sequence runs in low speed mode and then in high speed mode (if high speed mode allowed):

- acceleration (time depends on tube type)
- s run
- brake (time depends on tube type)

There is 2 s stop time between each speed mode.
During the test, the rotation safeties are checked the same way than in application mode.

Error codes reporting:

Error code	Associated data	Conclusion
0103H 0104H 0105H 0106H	Associated data points only to high speed mode	Power-off. Check if rotation board K2 relay is short circuiting the rotor capacitors. If yes replace the rotation board. If no replace the rotation capacitors
0103H 0104H 0105H 0106H	Associated data points to both high speed and low speed mode	Replace the rotation board

For the other error codes, refer to the troubleshooting table.

3-10 INVERTER GATE COMMAND DIAGNOSTICS

Purpose:

The purpose of this test is to verify that the HV power inverter drive is working properly. The IGBTs gate drive supply and the IGBTs gate drive is verified. At the same time verification is made that no inverter currents nor High voltage are measured. This test is performed without DC voltage applied to the inverter so that no Xray is generated. Anode rotation and filament drive are not activated during this test.

Pre-requisites:

- generator input line in an acceptable range (380V-10% to 480V+10% for 3-phase AC input)
- kV control board alive and running: S0-S7 Leds are lit successively or a combination of them blink
- inverter gate_cmd board DC supply present: DS300 neon is lit

Test type: Manual operation is required.

Sequence:

1/ Switch the system OFF. Ensure there is no voltage on AC/DC board
2/ FOR SILHOUETTE VR / PROTEUS XR/a
  - Remove DC BUS cable going to Inverter (refer to ”Inverter Power Assembly” Disassembly/Reassembly procedure)
  - Remove the EMC cover (refer to ”Inverter Power Assembly” Disassembly/Reassembly procedure)
  - Refer to Central Listing to ”GATE COMMAND BOARD” and to ”DUAL SNUB BOARD” or “QUAD SNUB BOARD” for leds location.

3/ Power on the Generator
4/ Verify that the DS1 neon on inverter dual snubbers or quad snubbers board is not lit
5/ Start the diagnostic and verify:

- error reported on the operator console
- inverter gate_cmd board Leds DS101, DS102, DS201, DS202 are lit: IGBTs gate drive supply is working properly

6/ Press the exposure switch (10 s exposure is taken after a 10 sec. delay)
7/ During the “exposure”, verify:

- error reported on the operator console
- inverter gate_cmd board Leds DS100 and DS200 are lit: IGBTs gate drive is working properly

8/ Release the exposure switch
9/ Power off the Generator
10/ Reconnect the 2 DC bus cables from the AC/DC board (see Central Listing).

Error reporting:

Error	Conclusion
DS1 neon lit	Check that DC bus cables have been removed
DS300 neon off	Check the gate_cmd supply cable between AC/DC and gate_cmd board
0301/0302/0303/0304/0309/0310/0311/0312/0313/0314/0319/0323 (H)	Check that DC bus cables have been removed. If yes, replace kV control board
0320	if problem persists, replace Kv control board
0501	kV control or inverter fault, replace inverter first
0503	kV control or inverter fault, replace inverter first
0504	kV control or inverter fault, replace inverter first
one of DS101/DS102/DS201/DS202 LEDs off while no error reported	Replace inverter
DS100 and/or DS200 LEDs off	Check cabling between kV control, HV Tank and gate_cmd board. If cabling is right, kV control or inverter fault, replace inverter first

3-11 INVERTER IN SHORT CIRCUIT DIAGNOSTICS

Purpose:

The purpose of this test is to verify that the HV power inverter is working properly. The inverter is commanded at a fixed frequency and is loaded with a short circuit. Verification is made that the inverter currents are correctly set. At the same time verification is made that no High voltage is measured. This test is performed without connecting the HV Tank to the inverter so that no Xray is generated. Anode rotation and filament drive are not activated during this test.

Pre-requisites:

- Generator input line in an acceptable range (380 V-10% to 480 V+10% for 3-phase AC input)
- kV control board alive and running: S0-S7 Leds are lit successively or a combination of them blink
- inverter gate_cmd board DC supply present: DS300 neon is lit
- inverter quad snubber board DC supply present: DS1/DS2 neon is lit
- Inverter gate command diagnostic passed without failure

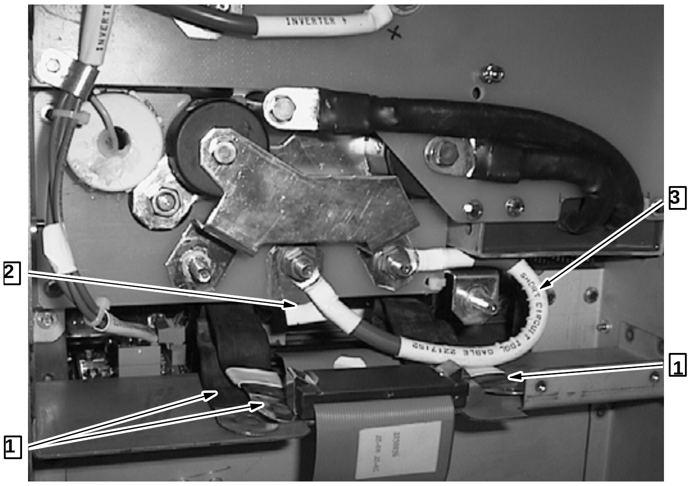
Test type: Manual operation is required.

Sequence:

1. Disconnect the HV Tank primary cables $\boxed{1}$ from the inverter (see HV Tank D/R job card).

Take care not to disconnect at the same time the IGBT middle point $\boxed{2}$

Put the short circuit cable $\boxed{3}$ (included in the first aid kit) between the two middle connections as shown:



2. Power on the Generator
3. Verify that the DS1/DS2 neon on inverter quad snubbers board is lit
4. Verify that the DS300 neon on inverter gate_cmd board is lit
5. Start the diagnostic and verify that no error is reported on the operator console
6. Press the exposure switch (100 ms exposure is taken)
7. Release the exposure switch
8. Verify error reported on the console
9. After exiting the test, power off the Generator
10. Remove the short circuit cable, reconnect the HV Tank primary cables (see HV Tank or Inverter Power Supply D/R job card). TAKE CARE OF THE POSITION OF THE TWO CABLES WITH WHITE RINGS.

Error reporting:

error	Conclusion
DS1/DS2 neon off	Check that DC bus cables between AC/DC and inverter
DS300 neon off	Check the gate_cmd supply cable between AC/DC and gate_cmd board
0301/0302/0303/0304/0309/ 0310/0319 (H)	Check that HV Tank primary cables have been removed. If yes, replace kV control board
0311	No Ilp current detected. See note 2
0312	No Ilr current detected. See note 3
0313	replace kV control board
0314	Ilr current resonant frequency is lower than expected. See note 4
0320	if problem persists, replace kV control board
0323	Both Ilr and Ilp currents not detected. See note 1
0501	kV control or inverter can be faulty
0503	kV control or inverter can be faulty
0504	kV control or inverter can be faulty
0505	Isolation fault between inverter components and ground. Check inverter inductors. If no faulty component, kV control or inverter can be faulty

NOTE 1: Ilp and Ilr currents not detected

1. Check the -15 V (Led DS1) on kV control board (see central listing).

If it is not lit, refer to “other failures” section. Else:

2. Power off the Generator. Wait until all neons are off
3. Check that the currents transformers (capacitor set) to gate_cmd board cable is correctly connected.

If yes:

4. Check that the inverter inductors are correctly connected. If yes:
5. Check that the gate_cmd to HV Tank cable and HV Tank to kV control cables are correctly connected.

If yes, replace the inverter

6. Reconnect all the cables

NOTE 2: Ilp current not detected

1. Power off the Generator. Wait until all neons are off
2. Check that the parallel inductor is correctly connected. If yes:
3. Check that the parallel inductor impedance is 0 Ohms. If no: replace inverter. If yes:
4. Check that inverter capacitors (capacitors set) are not broken. If yes, replace the capacitor set. Else:
5. Disconnect the currents transformers to gate_cmd board cable. Check that the parallel current transformer impedance is 0. If no: replace the capacitor set. Else:
6. Check that the gate_cmd to HV Tank cable and HV Tank to kV control cables are correctly connected. If yes:
7. Disconnect the HV Tank to kV control cable. Check that the impedance between pin 20 and pin 21 of J2 of HV Tank is 3,3 Ohms. If no replace the inverter. If yes replace kV control board.
8. Reconnect all the cables.

NOTE 3: **Ilr current not detected**

1. Power off the Generator. Wait until all neons are off
2. Check that the inductors are correctly connected. If yes:
3. Disconnect the currents transformers to gate_cmd board cable. Check that the serial current transformer impedance is 0. If no: change capacitor set. Else:
4. Check that inverter capacitors (capacitors set) are not broken. If yes, replace the capacitor set. Else:
5. Check that the gate_cmd to HV Tank cable and HV Tank to kV control cables are correctly connected. If yes:
6. Disconnect the HV Tank to kV control cable. Check that the impedance between pin 20 and pin 21 of J2 of HV Tank is 5 Ohms. If no replace iverter. If yes replace kV control board.
7. Reconnect all the cables

NOTE 4: **Ilr current resonant frequency is lower than expected**

1. Power off the Generator. Wait until all neons are off
2. Check that the inductors are correctly connected. If yes:
3. Check that the inverter capacitors (capacitors set) are not broken. If yes: replace the capacitor set. Else:
4. Disconnect the currents transformers to gate_cmd board cable. Check that the parallel current transformer impedance is 0. If no: change the capacitor set. Else: replace kV control board.
5. Reconnect all the cables

3-12 NO LOAD HV DIAGNOSTICS

Purpose:

The purpose of this test is to verify that the HV power inverter and HV tank are working properly. The exposure is taken as in application mode except that no filament drive nor anode rotation is running. Verification is made that the inverter currents are correctly set and that kV regulation is operating properly. As no filament drive is applied, no X-Ray are generated.
This test also allow to separate Generator from HV cable and x-ray tube problem by running it without the HV cables plugged on the HV tank (*).
(*) HV Receptacles must be filled with oil before starting test.

Pre-requisites:

- Generator input line in an acceptable range (380 V -10% to 480 V +10% for 3-phase AC input)
- kV control board alive and running: S0-S7 Leds are lit successively or a combination of them blink
- inverter gate_cmd board DC supply present: DS300 neon is lit
- inverter quad snubber board DC supply present: DS1/DS2 neon is lit
- Inverter gate command diagnostic passed without failure
- Inverter in short circuit diagnostic passed without failure.

Test type: Manual operation is required.

Sequence:

1. Power on the Generator
2. Start the diagnostic and verify:
   - error reported on the operator console
   - inverter gate_cmd board Leds DS101, DS102, DS201, DS202 are lit: IGBTs gate drive supply is working properly
3. Select kV (default = 80 kV) and exposure time (default = 1 sec.).
4. Press the exposure switch
5. During the “exposure”, verify:

- error reported on the operator console

6. Release the exposure switch
7. Power off the Generator

Error reporting:

See Troubleshooting Table.

3-13 AEC DIAGNOSTICS

Purpose:

The purpose of this test is to drive the AEC function in order to identify a faulty AEC, IF or kV control board FRU or the wrong connection between the AEC board and ion chambers.

Pre-requisites:

- application mode without AEC mode is running properly
- kV Control board alive and running: S0-S7 LEDs are lit successively or a combination of them blink
- cabling between IF board, AEC board and ionization chambers checked.

Test type:

Automated, with the use of Service Laptop

Sequence:

Select AEC function in menu 1 on Service Laptop.
Press V to run the test.
AEC function is verified through a series of 7 tests as follows:

- AEC return measurement test:

A voltage reference is switched to one input of the AEC select multiplex.
Nominal value of return voltage = 5.24 V
Test 1 is OK if: 4 V < measured value < 6 V
This test is also performed at lower frequency count up:
Test 2 is OK if: 4 V < measured value < 6 V.

- Switching Gain test (x10):

A voltage reference is switched to one input of the AEC select multiplex and count up gain is applied.
Nominal value of return volatge = 4.76 V
Test 3 is OK if: 4 V < measured value < 6 V.

- AEC ion chamber HV power supply test:

A portion of HV power supply is switched to one input of the AEC select multiplex:

  - No cell selected, Test 4 is OK if return voltage measurement is 0 V.
  - Select respectively one of the three cells, left, right, middle.

Test 5, 6, 7 are OK if: 1 V < measured value < 3 V.

Error codes reporting:

Error Code	Associated Data	Conclusion
1111111 (*)	None	Test OK
Any combination	None	Test KO = test failed; replace AEC board
0001000	None	Communication error: - Replace AEC board - If same problem, apart from a DOA board, suspect IF board then KV Control board.

(*) except for AEC board with serial number: 2184569-X: the resulting error code must be 0001111 (test is OK on this board the HV power supply test is not performed).
For the other error codes, refer to the troubleshooting table.

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CHAPTER 8 PLANNED MAINTENANCE

SECTION 1
PREVENTIVE MAINTENANCE ACTION LIST

The Proteus System does not require any Planned Maintenance activities for the first 13 months after system installation.
The following table lists the required planned maintenance activities and the associated Job Card for each task.

Note: The planned maintenance to the OTS suspension see Direction 2277285-100, OTS Suspension Service Manual.

OPERATION	FREQUENCY	JOB CARD	DESCRIPTION
GENERAL			
General cleaning and painting	As required	PM001	Keep all surfaces clean and touch-up paint chips
Visual inspection	12 months	PM002	Check for debris that would indicate abnormal wear
Functional checks	12 months	PM003	Perform the tasks described in Chapter 4, Functional Checks
TABLE BASE			
Control pedals and movement inhibition buttons	12 months	PM004	Check condition and functioning; ensure pedals and buttons have free play without any obstruction
Emergency buttons	12 months		Check condition and functioning; ensure buttons have free play without any obstruction
Electrical cables	12 months		Check condition of cable sheathing and correct routing
Power and ground connections	12 months		Check condition and connections
Connector panel and cable connectors	12 months		Check condition and connections
Replace lubricant box	12 months		Replace lubricant box
Check the lateral lock	12 months		Check whether the floating table can be pushed laterally when it’s locked
Clean the foot pedal	12 months		Clear up the foot pedals foreign matter (IV cap, cosmetic tips)/debris periodically. check foot pedal base contact with floor to make sure no clearance
PATIENT SUPPORT			
Surface finish	12 months	PM005	Check condition and clean
Longitudinal bearings	12 months		Check condition and lubricate with grease
Longitudinal bearing tracks and rails	12 months		Clean and wipe with light machine oil
Transversal rods and bearings	12 months		Clear up oil and dust on the rods
Rubber bumper end stops (Longitudinal & transversal)	12 months		Check condition of stops and tightness of anchoring
CASSETTE TRAY AND CARRIAGE			
Electrical connector and cable	12 months	PM006	Ensure connector is in good condition and making good contact; check condition of cable sheathing
Cassette handle assembly, push button & band holder	12 months		Ensure handle and push button have free play without any obstruction
Bearings and tracks (front and rear)	12 months		Check condition; clean and wipe with light machine oil and lubricate with grease

OPERATION	FREQUENCY	JOB CARD	DESCRIPTION
Rubber bumper end stops	12 months		Check condition of stops and tightness of anchoring
Tray	12 months		Check general condition of tray
Cassette size marker and locking assembly	12 months		Check condition; clean and wipe with light machine oil
ACCESSORIES			
Compression band	12 months	PM007	Check condition
Patient hand grips	12 months		Check condition
GENERATOR			
Check generator functions	12 months	PM008	Test exposure, including AEC if resent Record last error codes Record result on counters Check technique factors Tighten terminals and remove dust
Replace NonVolatile RAM on the kV Control Board	Every 8 Years	PM Jedi 15-2	1. Upload database 2. Battery replacement 3. Download database
WALL STAND (GPCP NO. 600-0301) (OPTIONAL COMPONENT)			
General cleaning and painting	As required	PM001	Keep all surfaces clean and touch-up paint chips
Visual inspection	12 months	PM002	Check for debris that would indicate abnormal wear
Functional checks	12 months	PM003	Perform the tasks described in Chapter 5, Functional Checks
Steel cables	12 months	PM009	Inspect and grease length of steel cables; replace if worn out
Carriage roller bearing inspection	12 months		Clean roller bearings and tracks
Vertical lock	12 months		Clean and inspect
LAT bar	12 months		Replace grease between the flanges
SG100 WALL STAND (GPCP NO. 2225849) (OPTIONAL COMPONENT)			
General cleaning and painting	As required	PM001	Keep all surfaces clean and touch-up paint chips
Visual inspection	12 months	PM002	Check for debris that would indicate abnormal wear
Functional checks	12 months	PM003	Perform the tasks described in Chapter 5, Functional Checks
Steel cables	12 months	PM010	Inspect and grease length of steel cables; replace if worn out
Carriage roller bearing inspection	12 months		Clean roller bearings and tracks
Counterweight Chain Maintenance	12 months		Inspect and grease length of chains. Replace if excessively worn or rusty.
Vertical lock	12 months		Clean and inspect
Angulation Components (lock & cable)	12 months		Inspect and Replace if necessary
Bucky Rotation Lock Check	12 months		Verify lock mechanism does not move
Electrical Checks	12 months		Inspect and replace any damaged cables or connectors. Check grounding.
SG120 WALL STAND (GPCP NO. 2402562) (OPTIONAL COMPONENT)			
General cleaning and painting	As required	PM001	Keep all surfaces clean and touch-up paint chips
Visual inspection	18 months	PM002	Check for debris that would indicate abnormal wear
Functional Checks	18 months		Perform tasks described in Chapter 5, Functional Checks

OPERATION	FREQUENCY	JOB CARD	DESCRIPTION
Carriage roller bearing inspection	18 months	PM011	Clean roller bearings and tracks
Counterweight Chain Maintenance	18 months		Inspect and grease length of chains. Replace if excessively worn or rusty.
Vertical lock	18 months		Clean and inspect
Electrical Checks	12 months		Inspect and replace any damaged cables or connectors. Check grounding.
JEDI PREVENTIVE MAINTENANCE			
Replace Nonvolatile RAM on the kV Control board	Every 8 Years		1. Upload database 2. Battery replacement 3. Download database
COLLIMATOR			
Check the collimator mounting screws	12 months	PM012	1. Check the flange. 2. If the collimator mounting screws are loose, apply LOCTITE onto the screws.
X-RAY TUBE CABLES CHECK			
Check the fixing and intactness of Anode Rotation cable and Thermal Protection cable	12 months	PM013	1. Check the fixing and intactness of Anode Rotation cable and Thermal Protection cable. 2. Check the stator cable strain relief.

SECTION 2
PREVENTIVE MAINTENANCE JOB CARDS

The following pages list the preventive maintenance Job Card detailed activities.

PROTEUS XR/a			**1/1**	**PM 001**
subassembly: **General Cleaning and Painting**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **15 min**	

SUPPLIES

Cleaning Liquids and compounds.
Touch-up paint.

TOOLS

None

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROCEDURE

1)Remove power from the system.
2)Carefully clean all surfaces of the system. Note any paint damage as you clean the system.
3)Apply touch-up paint to any paint-damage areas.
4)Reapply power to the system.

PROTEUS XR/a			**1/1**	**PM 002**
subassembly: **Visual Inspection**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:*	
	from / / *to* / /	*from* *to*	*Time:* **15 min**	

SUPPLIES

None.

TOOLS

None

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROCEDURE

1)Remove power from the system.
2)Visually check around the moving part of the system for any debris, wear or damage. This includes the table top, table base, and wall stand if present.
3)If any debris, wear of damage is observed, replace or repair the affected areas.
4)Reapply power to the system.

PROTEUS XR/a			**1/1**	**PM 003**
subassembly: **Functional Checks**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **50 min**	

SUPPLIES

None.

TOOLS

None

SAFETY PRECAUTIONS

No specific precautions.

PREREQUISITES

None.

PROCEDURE

Follow the functional checks specified in Chapter 5 of this Service Manual.

PROTEUS XR/a			**1/4**	**PM 004**
subassembly: **Table Base Maintenance**				
purpose: Maintenance Procedure			*version no*. 3 *date:* **10/10/06**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **45 min**	

SUPPLIES

Lubricant.

TOOLS

Measure tape, Oil-proofed gloves.

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROCEDURE

CAUTION **During the maintenances, before removing the motor from under the table, or untie the motor chain, to avoid the injury by the potential dropping table, put the blocks kit (5137108) over the rod.**

1)Control Pedals and Movement Inhibition Buttons.
  a) Confirm the control pedals can move up/down when double click and depressed the corresponding pedal. Adjust the locks as required if there is inappropriate table motion.
  b) Confirm the tabletop control pedal unlocks the tabletop when double click and depressed and locks the tabletop when released. Adjust the locks as required if there is inappropriate table motion.
  c) Confirm the inhibition button locks table motion when depressed and unlocks when released. Check the circuit if there is inappropriate motion.

2)Emergency buttons
  a) Confirm emergency button removes table power when depressed and applies table power when released.

3)Electrical cables.
  a) Remove power from system.
  b) Check condition of all cables including cable sheathing, connectors and overall condition; if any cable damage is noted, replace or repair affected cable.
  c) Confirm that the cable is correctly routed.

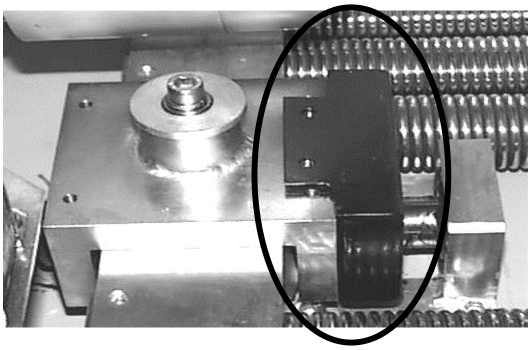
PROTEUS XR/a	**2/4**	**PM 004**

4)Power and ground cables.
a) Check that power is removed from system.
b) Check condition of all power and ground cables including cable sheathing, connectors and overall condition; if any cable damage is noted, replace or repair affected cable.
c) Confirm that the cable is correctly routed.

5)Connector panel and cable connectors.
a) Check that power is removed from system.
b) Check condition of all power and ground cables including cable sheathing, connectors and overall condition; if any cable damage is noted, replace or repair affected cable.
c) Confirm that the cable is correctly routed.
d) Reapply power when complete.

6)Table height limitation check.
a) Power on the table base.
b) Double click and depressed the **DOWN** pedal until the table motion stops automatically and confirm the table height is 550mm (560mm for table with Toe jam sensor).
c) Double click and depressed the **UP** pedal until the table motion stops automatically and confirm the table height is 800mm.

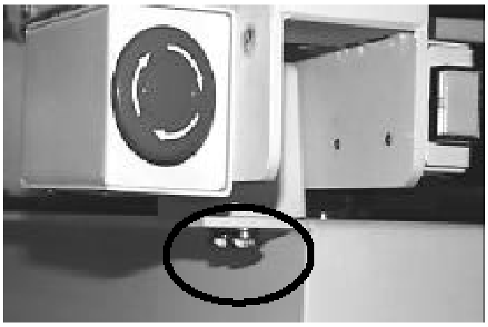
7)Replace lubricant box.
a) Raise the table base to its highest position.
b) Remove the table base cover.
c) Demount the two lubricant boxes.
d) Take off the blocks from new lubricant boxes.
e) Put two new lubricant boxes on.



Note: Lubricant box contains grease lubricant (Part No. 096-0020) inside, pls wear oil-proofed gloves during replacement, Refer to Materal Safty Data Sheet (MSDS) file attached for grease lubricant info.

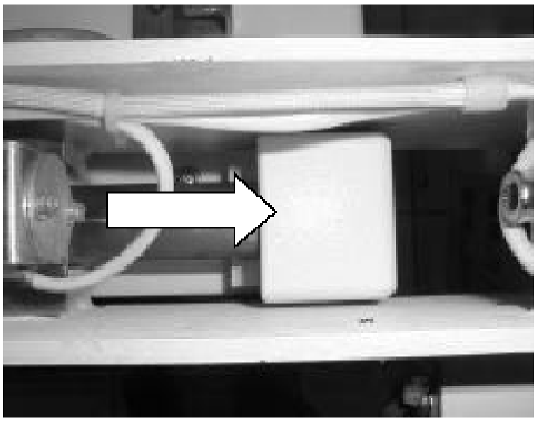
8)Check bearing and shaft.
a) Use a soft cloth to clean the lubricant oil on the surface of the shaft.
b) Use a soft cloth to clean the lubricant oil on the groove of bearing assembly and bushing.

9)Check lateral lock.
a) Power up the system.
b) Raise the table to its highest position.
c) Power off the system.
d) Remove the carbon fiber plate of the table top.
e) Remove the two screws fastening rod end support.



f) Remove the rod end support.

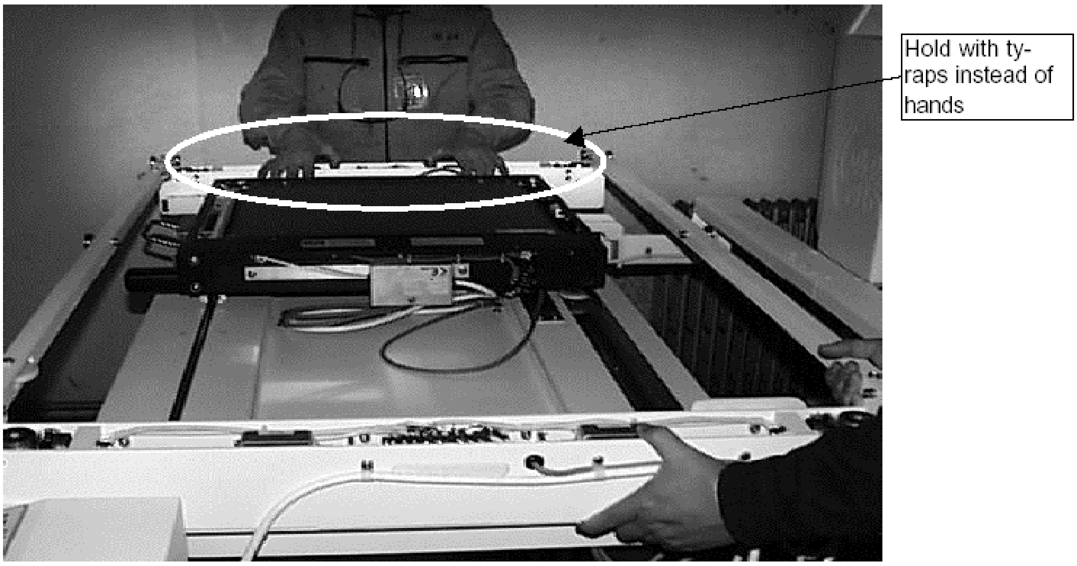
Note: ***Do one side at a time.***



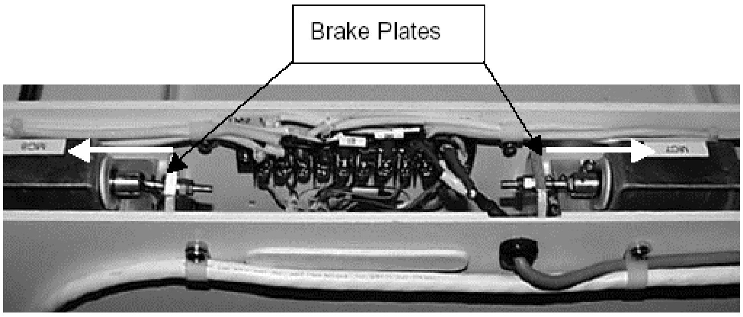
g) Pull out the supporting rod.

A. Hold the brake plates at release position with ty-raps.

B. FE, on the opposite side, pulls the corner of the table frame which has been removed rod end support.



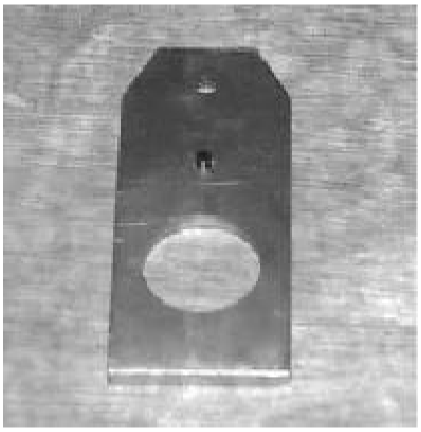
Hold with ty-raps instead of hands



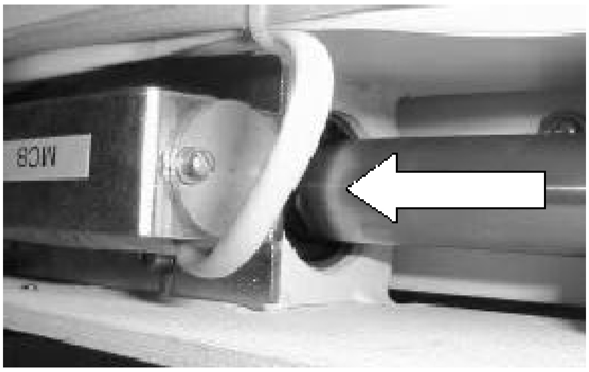
Brake Plates

C. When the rod is pulled out of rod end support, take out the rod.

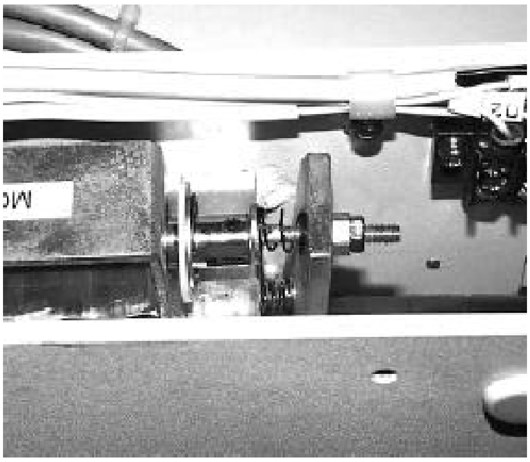
h) Remove the old brake plates and replace them with new ones (renewal part number is 612-3440).

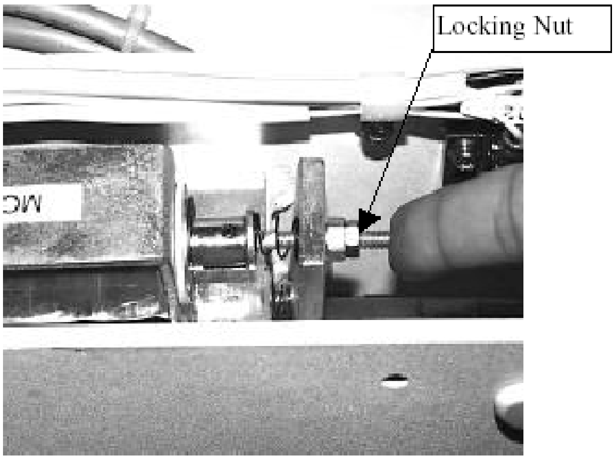


i) Use a soft cloth to clean the lubricant oil on the surface of a new rod (renewal part number is 613-3003)
j) Use a soft cloth to clean the lubricant oil in the groove of the two bearings on each side.
k) Insert the new rod.



l) Adjust the screws to make sure the plate travel distance is between 3-5mm, and lock it with locking nut.





m) Repeat the similar steps from e to l as above, to replace the rod and couple of brake plates on the other end of the table.

10) Clean the foot pedal.

PROTEUS XR/a		**1/2**	**PM 005**
subassembly: **Patient Support Maintenance**			
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* **45 min**

SUPPLIES

Grease.
Light Machine Oil.

TOOLS

None.

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROTEUS XR/a	2/2	PM 005

PROCEDURE

1)Surface finish
Remove the dust from the table top and table topside rails.

2)Longitudinal bearings
Remove the dust.

3)Longitudinal bearing tracks and rails
Remove the dust from the bearing tracks and rails. Add the light machine oil on the tracks and rails.

4)Transversal rods and bearings
Remove the dust.

5)Rubber bumper end stops (longitudinal and transversal)
Verify the bumper stops have no cracks and one fixed tightly.

PROTEUS XR/a			**1/2**	**PM 006**
subassembly: **Cassette Tray and Carriage Maintenance**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **45 min**	

SUPPLIES

Grease.
Light Machine Oil.

TOOLS

None.

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROTEUS XR/a	2/2	PM 006

PROCEDURE

1)Electrical connector and cable
Confirm properly connected.

2)Cassette handle assembly, push button and hand holder
Check the push button function. Check the movement with the handle functions.

3)Bearings and tracks(front and rear)
Remove the dust and add grease or light machine oil.

4)Rubber bumper and stops
Confirm the bumper and stops have no cracks and one fixed tightly.

5)Rubber bumper end stops (longitudinal and transversal)
Verify the bumper stops have no cracks and one fixed tightly.

6)Tray
Confirm the pull-in and pull-out movement is smooth.

7)Cassette size marker and locking assembly
Check the cassette size marker is firmly set and the cassette locking assembly is functional.

PROTEUS XR/a			**1/1**	**PM 007**
subassembly: **Accessories Maintenance**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **15 min**	

SUPPLIES

None.

TOOLS

None.

SAFETY PRECAUTIONS

None specific precautions.

PREREQUISITES

None.

PROCEDURE

1)Compression band
Mount and remove the compression band on the table top.

2)Hand grip
Mount and remove the hand grip on the table top.

PROTEUS XR/a			**1/4**	**PM 008**
subassembly: **Generator Functional Checks**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **60 min**	

SUPPLIES

Film.
Error–code recording form.
X–ray counter recording form.

TOOLS

Laptop.

SAFETY PRECAUTIONS

No specific precautions.

PREREQUISITES

PROTEUS XR/a	2/4	PM 008

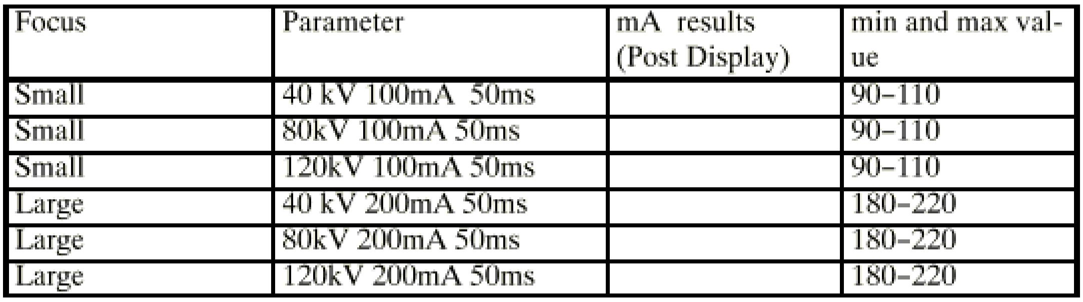
PROCEDURE

1.1 Test exposure

Technique factors (mA, mAs and ms) are displayed after exposure on the console.

1.2 mA accuracy

Run the exposures in table below and check if the mA value on console after exposure is between the min and max value.
If not , run the same exposure 10 times with exposure time set to 12.5s and then check again.



Focus	Parameter	mA results (Post Display)	min and max value
Small	40 kV 100mA 50ms		90–110
Small	80kV 100mA 50ms		90–110
Small	120kV 100mA 50ms		90–110
Large	40 kV 200mA 50ms		180–220
Large	80kV 200mA 50ms		180–220
Large	120kV 200mA 50ms		180–220

1.3 AEC functionality check (if existing)

Put 15cm of Plexiglas or a plastic bucket with 15 cm of water on the table top
Select Two point mode (mAs)
Set kV to 80 kV and mAs to 600
Run the exposure
Develop the film
Check that the density is 1 +/–10%.If not redo AEC calibration. (See Job card in chapter 3)

PROTEUS XR/a	**3/4**	**PM 008**

2. Record last error codes

Go to calibration mode by using keys “ALT and S”
Go to MENU 2 with arrow keys
Press (F3) to select LIST
Press (F5) to select the first error code
Fill the chart below with the error code number
Then use F5 key for following error code.

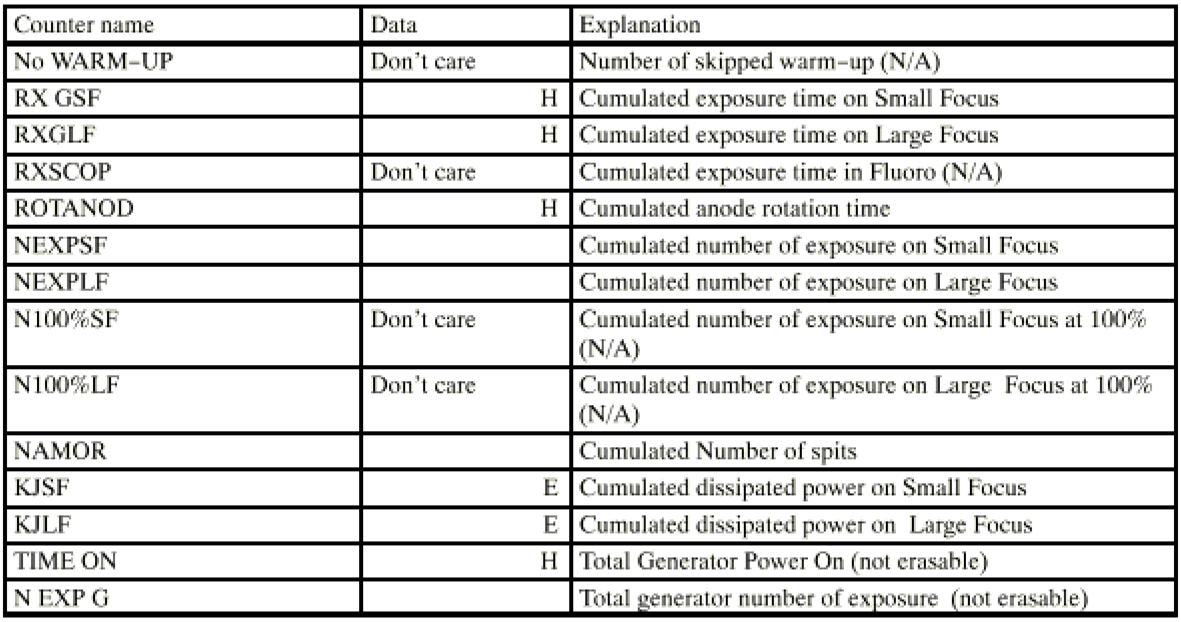
Simplified Error Code	Error Code	Generator Phase	Error Class	Data associated with the Error Code	Number of occurrences	Date and Time
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

Refer to diagnostic section (Chapter 7) for fix error (if necessary).
Clear the Error Log after checking. (Use CTRL and H keys, then confirm with W key).

PROTEUS XR/a	**4/4**	**PM 008**

3. Record results on counters

Go to calibration mode by using keys “ALT and S”
Go to MENU 2 with arrow keys
Press (F5) to select NEXP(Number of EXPosures)
Press (F5) to select the first counter
Fill the chart below with the counter number



Counter name	Data	Explanation
No WARM–UP	Don’t care	Number of skipped warm–up (N/A)
RX GSF	H	Cumulated exposure time on Small Focus
RXGLF	H	Cumulated exposure time on Large Focus
RXSCOP	Don’t care	Cumulated exposure time in Fluoro (N/A)
ROTANOD	H	Cumulated anode rotation time
NEXPSF		Cumulated number of exposure on Small Focus
NEXPLF		Cumulated number of exposure on Large Focus
N100%SF	Don’t care	Cumulated number of exposure on Small Focus at 100% (N/A)
N100%LF	Don’t care	Cumulated number of exposure on Large Focus at 100% (N/A)
NAMOR		Cumulated Number of spits
KJSF	E	Cumulated dissipated power on Small Focus
KJLF	E	Cumulated dissipated power on Large Focus
TIME ON	H	Total Generator Power On (not erasable)
N EXP G		Total generator number of exposure (not erasable)

4. Check technique factors

Run the Accuracy checks in “Functional Check procedure” in Chapter 4.
Make a copy of illustrations 3, 4, 5, and 6 and fill it with the results you get.

5. Tighten terminals and remove dust

- Tighten the inputs connections on generator , located near the labels on AC/DC module (refer to illustration in disassembly / reassembly section).
- Tighten the DC bus connections on generator located on the upper side of the generator (refer to illustration in disassembly / reassembly section).
- Verify if all connectors are correctly plugged in.
- Remove dust by using a vacuum-cleaner.

PROTEUS XR/a			**1/2**	**PM JEDI 15-2**
subassembly: **Replace Generator Non Volatile Parameters RAM**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **21/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **45 min**	

1 SUPPLIES

None.

2 TOOLS

5.5 mm nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that the power is off.

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

Upload the database that is stored in the RAM before starting the replacement procedure (refer to Job Card CAL JEDI 8-6 ”Backup & Restore Database Setup Parameters”).

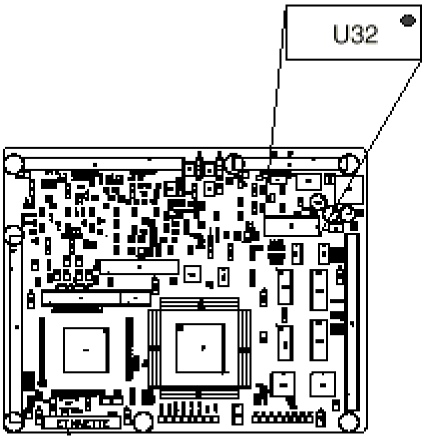
PROTEUS XR/a	2/2	PM JEDI 15-2

5 PROCEDURE

5-1 Remove and Replace the RAM

On the kV Control board, note the direction that the RAM faces. Insert the tip of a small screw driver underneath left side of U32 and lever gently, then grasp it between your thumb and forefinger and pull it directly away from its support on the board.

Insert the new Nonvolatile Parameters RAM in its place. Be careful to insert it facing in the same direction.



kV Control Board

Refer to Central Listing section for more details.

CAUTION **This NV RAM contains a LITHIUM CARBON MonoFlouride (LiCFx) battery, used to provide the battery backup for the static RAM and the time keeper device. Electrical Characteristics: 3 V - 49 mAh type BR 1225.Resend the former component to your local GEMS representative for recycling.**

5-2 Download Database

Reapply power.

Download the database (refer to Job Card CAL JEDI 8-6 ”Backup & Restore Database Setup Parameters” in Chapter 4).

PROTEUS XR/a			**1/1**	**PM 009**
subassembly: **Wall Stand**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **05/04/01**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **15 min**	

SUPPLIES

None.

TOOLS

None

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROCEDURE

1) Remove power from the system.
2) Inspect steel cables; replace if worn out.
3) Clean carriage roller bearings and tracks.
4) Clean and inspect the vertical lock.

PROTEUS XR/a			**1/1**	**PM 010**
subassembly: **SG100 Wall Stand**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **05/04/01**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **15 min**	

SUPPLIES

None.

TOOLS

None

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROCEDURE

1) Remove power from the system.
2) Inspect steel cables; replace if worn out.
3) Clean carriage roller bearings and tracks.
4) Clean and inspect the vertical lock.
5) Counter Weight Chain Maintenance.
6) Inspect Angulation Components (lock &cable).
7) Check Bucky Rotation Lock.
8) Electrical Checks.

Note: The procedures in this Job Card are concerted with the revision 6 of SG 100 Wall Stand Service Manual (GPCP Number 2150297-100). For the reason of the update and change in that manual, it is recommended to see also the latest Service Manual of SG 100 Wall Stand for reference.

PROTEUS XR/a			**1/1**	**PM 011**
subassembly: **SG120 Wall Stand**				
purpose: Maintenance Procedure			*version no*. 0 *date:* **30/09/04**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* **15 min**	

SUPPLIES

None.

TOOLS

None

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROCEDURE

1) Remove power from the system.
2) Clean carriage roller bearings and tracks.
3) Clean and inspect the vertical lock.
4) Counter Weight Chain Maintenance.
5) Electrical Checks.

PROTEUS XR/a		**1/1**	**PM 012**
subassembly: **Collimator**			
purpose: Maintenance Procedure			*version no*. 0 *date:* **27/09/01**
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* **15 min**

SUPPLIES

None.

TOOLS

Allen Key
Calliper

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

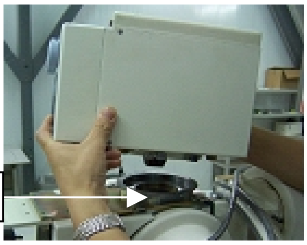
None.

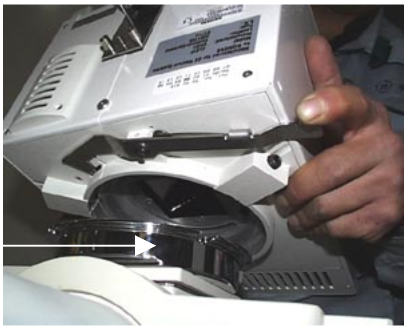
PROCEDURE

1) Remove power from the system.
2) Turn the tube over, and then demount the collimator.

For MX100 X-ray tube, skip without performing step 3)

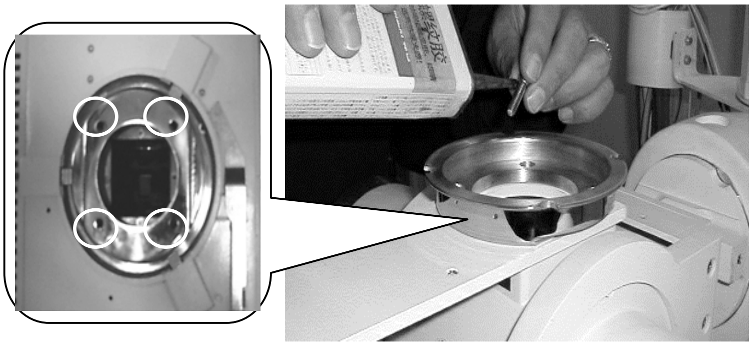
3) Check the mounting flange. If wear on the flange is found (the thickness of the flange edge is below 1.5mm), the flange should be replaced with a new one. Ordering information please refer to Chapter 9.





For Proteus XR/a Collimator, follow 4) and 5).
For Eclipse Proteus Collimator, skip to 6) directly.

4) Check the collimator mounting screws. If they are loose, please follow the Job Card IST015 or IST017 for MX100 X-ray tube in Chapter 2 to apply LOCTITE onto the screws.
5) Follow the Job Card IST015 or IST017 for MX100 X-ray tube in Chapter 2 to securely mount the collimator.



PROTEUS XR/a		**1/1**	**PM 013**
subassembly: **X-ray tube cables**			
purpose: Maintenance Procedure		*version no*. 1 *date*: **12/12/05**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*
	from / / *to / /*	*from* *to*	*Time:* **15 min**

SUPPLIES

None.

TOOLS

None

SAFETY PRECAUTIONS

Remove power from the system before beginning work.

Check that power is off.

PREREQUISITES

None.

PROCEDURE

1) Remove power from the system.
2) Check the fixing and intactness of Anode Rotation cable and Thermal Protection cable.
3) Check the stator cable strain relief marked in the illustration for RAD 14,21 X-ray tube.
4) Check the intactness of heat shrink tube, check the fastness of cable clamp and copper strap for RAD 14, 21 tube.

Note: Step 3) is only for RAD 14, 21 X-ray tube, not for MX100 X-ray tube.

Figure 1: RAD 14 X-ray Tube

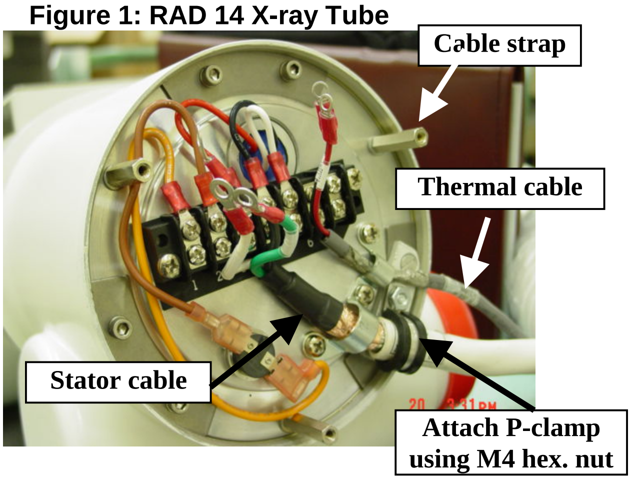
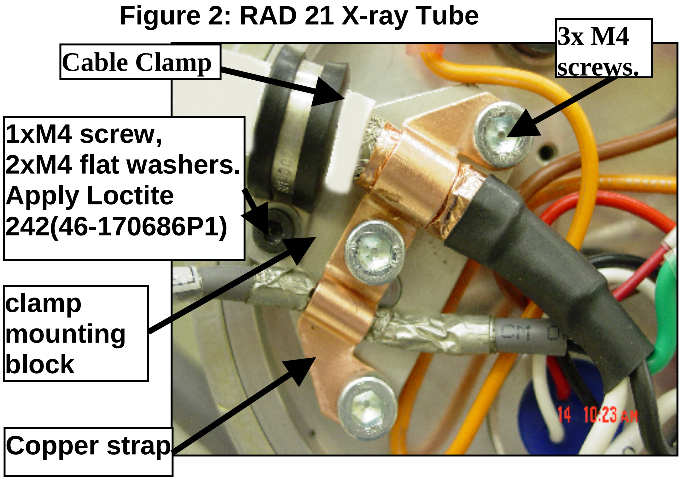

Cable strap
Thermal cable
Stator cable
Attach P-clamp using M4 hex. nut

Figure 2: RAD 21 X-ray Tube


Cable Clamp
3x M4 screws.
1xM4 screw, 2xM4 flat washers. Apply Loctite 242(46-170686P1)
clamp mounting block
Copper strap

CHAPTER 9 RENEWAL PARTS

SECTION 1
PROTEUS XR/a SYSTEM RENEWAL PARTS LIST (Not include Jedi Generator)

WARNING **FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH THE SAME TYPE AND RATING OF FUSE.**

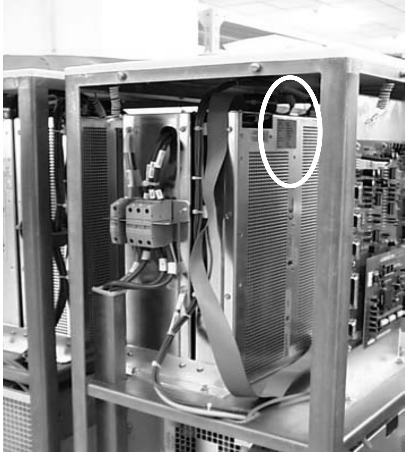
Item #	FRU Level	GPCP NO.	Description	Quan.
Table				
1	2	2259298-14	Table top longitudinal move wheel	2
2	1	2226325-34	Table top bearing	4
3	2	612-3100	Table Top Frame Assy	1
4	1	2259298-31	Table top bearing	4
5	1	2259298-5	EM lock	4
6	1	2259298-23	Micro-movement anti-collision switch	4
7	1	2259298-30	Table top bearing	6
8	1	2259298-6	EM lock	4
9	1	2259298-9	Table elevating motor chain	1
11	1	2338145	(Localized) Cassette Tray-Size Sensing	1
12	2	46-286129p22	Fixed grid (12:1 100cm 60l/cm)	1
13	2	46-286129p1	Bucky grid (12:1 100cm 36l/cm)	1
14	2	2259298-15	Bucky movement bearing	4
15	1	2252611-3	Ion chamber	1
16	1	2259298-71	Table bucky handle	1
17	1	2259298-22	Bucky-lock button	1
18	2	2288705	Bucky handle	1
19	2	2288706	Bucky handle button	1
20	1	2259298-19	Safety button	2
21	1	2259298-27	Table height measure potentiometer	1
22	1	5336380	Pedal I/F board assy (Note: Refer to 5517052-1EN for FRU replacement)	1
24	1	2259298-18	Switch power supply 24VDC 6.5A	1
25	1	2259298-17	AC contactor 240VAC, 2.5kW	1
26	1	2259298-16	Transformer 220AC/30VDC 50W	1
27	1	2259298-26	Table logic control board assy	1
28	1	2259298-7	Table elevating motor	1
29	2	2364950	Table top	1
30	2	2259298-70	Table side cover	2
32	2	2259298-69	Table front & back cover	2
34	1	2259298-67	Bucky EM lock	1
35	1	2259298-68	Bucky power fuse 250V 160mA	2

Item #	FRU Level	GPCP NO.	Description	Quan.
36	2	2259298-10	Table up/down spring	6
37	1	2348721	Lubricant box	1
38	1	2189553	Table Bucky (LH)	1
39	1	2362889	Bucky Bar Assembly	1
42	2	2259298-11	Table spring	2
43	1	2259298-12	Table top bumper	2
44	1	2259298-20	Inhibition button	2
45	2	2260192	Hand grip (pair)	1
46	1	612-3440	Lateral table lock plate assembly	4
47	2	611-3610	Table bottom front & back cover	2
48	2	611-3601	Table bottom side cover	2
49	1	2259298-21	Emergency stop switch	2
50	1	610-3100	Emergence OFF Switch Assy	2
51	1	2357655	Long sliding ribbon	2
52	1	2357656	Short sliding ribbon	2
53	1	2336280	Spring leaf	2
55	1	612-3408	Brake Vane	1
56	1	613-3400	Camera Bracket Assembly	1
57	1	613-3003	Linear bearing shaft	1
58	1	2284482	Condor table relay assembly	1
59	1	5137108	Table Brake Block	1
60	1	5159516-1	Reciprocating Bucky L/H	1
61	1	5159516-2	Reciprocating Bucky R/H	1
62	1	5166100	Step Motor	1
63	1	5166198	Circuit Board L/H	1
64	1	5166059	Circuit Board R/H	1
65	1	5166209	Rail Kit	1
66	1	5166188	250VAC, 315mA Fuse	1
67	1	5166307	250VAC, 160mA Fuse	1
68	1	5167409	AID Ion Chamber	1
69	1	5167409-2	AID Ion Chamber with 24 meter cable	1
70	1	5166578-1	Rubber stopper (6)	1
72	1	5160837-1	Table top warning label	2
73	1	5310199	Table Endcap	1
74	1	2259298-25	Table limit IF board	1
75	1	5336373	Sensor Flag 1 (Note: Refer to 5517052-1EN	2
76	1	5336374	Sensor Flag 2 (Note: Refer to 5517052-1EN	6
77	1	5337905	jig for sensor flag	1
78	1	2381618	Table front pedal assembly	1
79	1	2381615	Table rear pedal assembly	1

Item #	FRU Level	GPCP NO.	Description	Quan.
80	1	5336382	Shim group	4
81	1	221-3004	FRONT PEDAL I/F CABLE	1
82	1	221-3005	BACK PEDAL I/F CABLE	1
83	1	5339135	Warning Label for FC table Inhibition Button	2

*1: Item 68 will replace item15. These two kinds of Ion-chamber have same installation procedures and functions.

Note: If JEDI's model number on it's label (see the figure) is 2268970, you should follow the table Cabinet 1. If the number is 2244165-2, you should follow the table Cabinet 2.



Item #	FRU Level	GPCP NO.	Description	Quan.
Cabinet 1				
1	1	2375230	System I/F Board (replace System I/F Board 2259298-45 and CAN I/F Board 2259298-46) CAUTION **The System I/F board 2375230 can be used together with Rev2.14 or above version of the System Console Software.**	1
2	1	5164678	No Fuse Breaker 690V 100A	1
3	2	2259298-113	Contactor S-N95 150A/690V AC100V	1
4	1	2259298-114	Spark Killer CR-50500	1
5	1	2259298-115	Fuse RS414-061 10A/500V	1
6	1	2259298-116	Fuse RS414-055 5A/500V	1
7	1	2259298-117	Fuse Holder FZRRAZ N091483 32A/690V	2
8	1	2259298-41	Fuse Holder	7
9	1	2259298-121	Fuse 61NM 6.3A/250V	1
10	1	2226325-9	Fuse 61NM 2.5A/250V	3
11	1	2226325-10	Fuse 61NM 5A/250V	1
12	1	2226325-11	Fuse 61NM 8A/250V	2

13	2	2259298-118	Fuse Holder SI 000 DIN 80	3
14	1	2259298-119	Fuse 6.6gRB 000 DO8V/125	3
Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**
15	1	2259298-123	Noise Filter	2
16	2	2259298-124	Terminal block SAK 2.5 EN Assy	
17	1	2259298-122	Mov Board Assy	1
18	1	2226325-8	Spark Killer 150VAC 0.3µF 150Ω	1
19	2	2259298-120	Contactor S-N10 20A/690V AC100V	1
20	1	2259298-127	Relay LY2 110VAC	1
21	1	2259298-128	Relay LY1 12VDC	1
22	1	2226325-6	Relay LY2 12VDC	1
23	2	2259298-39	Relay Socket	3
24	1	2259298-34	SW power supply 12V, 5A	1
25	1	2259298-35	SW power supply +5V, ±12V, 25W	1
26	1	2259298-126	Noise Filter ZGB2202-01U 250V/2A	2
27	1	2259298-44	DC Power Board	1
28	2	2259298-32	Transformer 1.9kW Input:360/480V Output:24/240V	1
29	2	2259298-112	Transformer 400VA Input:360V/480V Output:100V	1
30	2	91651653	Bucky Connector	1
31	1	2281982	Tomo I/F PCB	1
32	1	2226325-9	Fuse (for MX100 X-ray tube fan and SG100 Wall Stand)	2
33	1	2372633	Power filter	1
34	2	221-2742	L side panel assy.	1
35	2	221-2744	R side panel assy.	1
36	2	221-2746	Back side panel assy.	1
37	2	221-2748	Front side panel assy.	1
39	2	2259973-1	Proteus System Cabinet (32KW)	1
40	2	2259973-2	Proteus System Cabinet (50KW)	1
41	2	2259973-3	Proteus System Cabinet (65KW)	1
42	2	2259973-4	Proteus System Cabinet (80KW)	1
43	2	2215674	Rotor Capacitor Set	1

Item #	FRU Level	GPCP NO.	Description	Quan.
Cabinet 2				
1	1	2226325-4	No fuse breaker 480V 50A	1
2	1	2226325-8	Spark killer 150VAC 0.3µF 150Ω	1
3	1	2226325-3	Contactor S-N50 600V 50A	1
4	2	2259298-41	Fuse holder	7
5	1	2226325-11	Fuse 8A/250V	1
6	1	2226325-10	Fuse 5A/250V	2
7	1	2226325-9	Fuse 2.5A250V	4
8	2	2259298-40	Fuse holder	2

9	1	2259298-33	Fuse 10A500V	1
10	1	2226325-12	Fuse 2A/500V	1
11	2	2259298-43	Fuse holder	1
12	1	2259298-42	Fuse 125A/1000V	3
Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**
15	1	2226325-7	Noise filter	2
16	1	2226325-6	Relay 220VAC 10A and 24VDC 10A	2
17	2	2259298-39	Relay socket	2
18	1	2259298-35	SW power supply +5V, ±12V, 25W	1
19	1	2259298-34	SW power supply 12V, 5A	1
20	1	2259298-44	DC power board	1
21	2	2259298-32	Transformer 1.9kW Input:360-480V Output:24-240V	1
22	2	2226325	Transformer 250VA Input:360/480V Output:100V	1
23	1	2281982	Tomo I/F PCB	1

Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**
Wall Stand				
1	1	2259298-47	EM locks (pair)	1
2	1	2259298-51	Hand grip switch	2
3 (1)	1	2189553-2	Bucky(RH)	1
3 (2)	1	2189553	Bucky(LH) is same as Table Bucky (LH)	1
4	1	2259298-30	Bearing	8
5	1	2259298-92	Steel Cable	2
6	2	2259298-93	Rail Bearings (pair)	1
7	2	2259298-96	Fixed grid (10:1 180cm 60l/cm)	1
8	2	2259298-49	Bucky grid (10:1 180cm 43l/cm)	1
9	2	080-1008-22	Grid	1
10	2	080-1009-22	Grid	1
11	1	603-3220	Steel Cable (for the wall stand with a knee spacer)	1
12	1	021-0291	Bearing (for the wall stand with a knee spacer)	1
13	1	021-0293	Bearing (for the wall stand with a knee spacer)	1
14	2	602-3339	Hand Rest Assy (for the wall stand with a knee spacer)	1
15	2	096-0036	Plunger(for the wall stand with a knee spacer)	1
16	1	601-3600	Power-off Protection Lock	1
17	2	604-3010	Wall Stand Bucky Cover	1
18	2	220-2125	Wall Stand Pedestal Cover	4
19	2	600-0027	Chin Rest	1

20	1	2338145	(Localized) Cassette Tray-Size Sensing	1
21	1	5159516-1	Reciprocating Bucky L/H	1
22	1	5159516-2	Reciprocating Bucky R/H	1
Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**
23	1	5166100	Step Motor	1
24	1	5166198	Circuit Board L/H	1
25	1	5166059	Circuit Board R/H	1
26	1	5166209	Rail Kit	1
27	1	5166188	250VAC, 315mA Fuse	1
28	1	5166307	250VAC, 160mA Fuse	1
29	1	5167409	AID Ion Chamber	1
30	1	5167409-2	AID Ion Chamber with 24 meter cable	1

Note: For SG100 Wall Stand (GPCP No. 2225849) FRU, refer to SG100 Service Manual (2150297-100).
Note: For SG120 Wall Stand (GPCP No. 2402562) FRU, refer to SG120 Service Manual (Supplier Part No. S0012532).

Note: For 2189553 and 2189553-2 Bucky FRU, refer to following table.

Item #	FRU Level	GPCP NO.	Description	Quan.
BUCKY				
1	1	2203332	MOTOR ASSY (LEFT HAND)	1
2	1	2207210	MOTOR ASSY (Right HAND)	1
3	1	2203422	BUCKY PWB LEFT HAND	1
4	1	2207209	BUCKY PWB RIGHT HAND	1
5	1	2203334	CAVO SENSING DEVICE	1
6	1	2203333	GUIDE	1
7	1	2203421	CAVO ALIMENTAZIONE	1
8	1	2189553	MB 2000 LH	1
9	1	2189553-2	MB 2000 RH	1
10	1	58079705	FUS T 5X20 0,25A 250V V 35A ULL	1

Item #	FRU Level	GPCP NO.	Description	Quan.
OTS				
1	2	2273436	Anode cover assy.	1
2	2	2273439-2	Cathode cover assy.	1
3	2	2273442	Top cover assy.	1

4	1	2259298-54	Auto collimator	1
5	2	2273450	Trunion scale assy.	1
6	1	2320993	OCS console	1
7	2	2273439	Cathode cover assy.	1
8	2	2278757	Top cover assy.	1
9	1	2271727	Collimator Bulb (For Auto and Manual Collimator)	1
10	1	2271728	Fuse (1.6A 250V)	2
11	1	2271729	Tape Measure.	1
12	1	2271730	Bulb Fan	1
13	1	2307338	PCB D1	1
14	1	2307340	PCB D2	1
15(1)	1	2259981	X-ray Tube, Rad14	1
15(2)	1	2271627	X-ray Tube, Rad21	1
15(3)	1	2226680	X-ray Tube, Rad12	1
15(4)	1	D2301R (46-155400G281)	X-ray Tube, MX100	1
16	2	610-3150	Trunion used for 65, 80 kW (for Rad21)	1
17	2	2259298-95	Trunion used for 32, 50 kW	1
18	1	2259989	Manual collimator	1
19	1	241-0267	Auto collimator Terminator	1
20	1	2257211	OTS SW Power Supply	1
Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**
21(1)	2	610-3099	Mounting Plate for Collimator for Rad 12 or 14	1
21(2)	2	610-3099-02	Mounting Plate for Collimator for Rad 21	1
22	2	610-3650	Tube- Connector	2
23	2	2272214-3	Tube Cover Kit (for 65, 80kW) (for Rad21)	1
24	2	2272214-2	Tube Cover Kit (for 32,50 kW)	1
25	2	610-3173	Tube cooling fan kit for FC 2	1
26	1	610-3175	Resistor Assembly For FC2 Tube Fan	1
27	2	610-3181	Fan Set	1
28	2	2301864	R21 Tube Fan Installation Manual	1
29	1	2318537	OCS Console Button Kit	1
30	2	221-2995	APR Back-up Floppy Disk (set)	1
31	2	241-2703	AEC Fast Calibration Floppy Disk	1
32	2	2303649	Jedi 80 R1T/Rad21 with Fan SW Disk	1
33	2	008-8002	M5X12 Socket Set Screw From Bossard	4
34	1	2325424	Collimator Plastic Front Cover	1
35	1	2345789	Collimator display	1
36	1	2348513	Thermal Switch For Tube Rad 12,14&21	1
37	2	2273368	Condor/F.C. bottom tube Cover	1
38	2	2273371	Condor top tube cover ASM	1
39	2	2273365	Condor anode end bracket	2

40	2	2273366	Condor cathode end bracket	2
42	2	2364939	Spacer of tube mount	1
43	2	2352540	Extended Tomo-link Yoke	1
44	1	2372800	Cone Assembly with lable	1
45	1	2379458	Lead cup Assy. for MX100 X-ray tube	N
46	1	2375334	Condor UIF to Tube (MX100) Mounting Bracket	1
47	1	2375342	Collimator Mount Ring for Condor (for MX100 tube)	1
48	1	2375344	Ring to Retain Collimator Mount Ring (for MX100 tube)	1
49	1	2375341	Collimator Mount Retainer Condor (for MX100 tube)	4
50	1	2375320	Spacer for Condor UIF Bracket (for MX100 tube)	1
51	N	2364938	Condor User Interface Condor BRKT (for MX100 tube)	1
52	2	2278999	FC2 Connecting Bracket	2
53	2	46-208765P36	Tube Cover clamp	1
54	2	2269030-10	GE logo	1
55	N	2383309	Aluminium Plate	1
56	1	2271734	Manual Collimator D7 Electronic Board	1
57	1	2399471	Auto Collimator AL-07F Detent Handle	1
Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**
58	1	2278999	Tube Cover Adapter Bracket	1
59	1	2379827	Eclipse Proteus Collimator	1
60	1	2383312	Eclipse Proteus Collimator Control Board	1
61	1	2383313	Eclipse Proteus Collimator User Interface Board	1
62	1	2377082	Eclipse Proteus Collimator Lamp	1
63	1	2383804	Eclipse Proteus Collimator Bucky Centering Laser	1
64	1	2385357	Eclipse Proteus Collimator LCD Display	1
65	1	2383805	Eclipse Proteus Collimator Tape	1
66	1	5126798	APR backup floppy disk for 65kW and 80kW	1
67	1	610-3170	Tube ground clamp	1
68	1	2383799	Tube flange	1
69	1	5126970	Tube flange for Rad 14	1

Note : When replace the failed Siemens collimator with Eclipse Proteus Collimator (2379827), please order a tube flange (2383799 for Max100 or 5126970 for Rad14) together with new collimator collimator.

Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**

Console				
1	1	2259976	System console	1
2	2	2260190	Console printer kit	1
4	2	098-0031	System console exposure hand switch	1
5	1	5178302	System console warning label	1
6	1	2382506	FC Spanish label kit	1

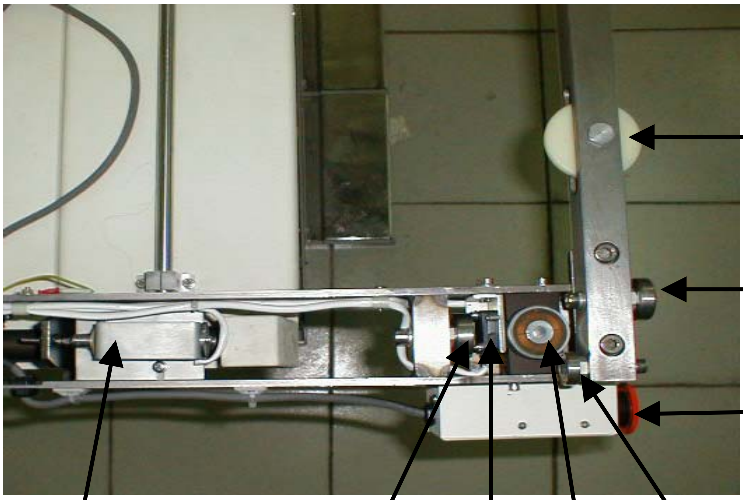
Item #	FRU Level	GPCP NO.	Description	Quan.
Cables				
1	1	2259298-56	Table height cable SID cable	1
2	1	2259298-57	Table power cable	1
3	1	2259298-58	Cassette size sensing cable	1
4	1	2259298-60	System console cable kit	1
5	1	2259298-63	Bucky control cable	1
6	1	2259298-65	Wall stand power cable	1
7	1	2259298-73	Grounding Wire	2
8	2	221-2734	Tomo CAN & RTL Cable	1
9	2	221-2996	Tomo Interface Cable	1
10	2	221-2997	Table/Tomo Interface Cable	1
11	2	221-2999	Tomo-link Power Cable	1
Item #	**FRU Level**	**GPCP NO.**	**Description**	**Quan.**
12	2	241-0266	Manual Collimator Cable	1
13	2	221-2736	WS Lock Power Cable	1
14	2	46-173995P11	Cable	1
15	2	46-173995P12	Cable	1
16	2	421-0001-02	Fan Cable	1
17	2	421-0001-03	Fan Earth Cable	1
18	2	221-3011	Table Inter SID Cable	1
19	2	221-3020	Table Inter Power Cable	1
20	2	221-3008	Lim_BD I/F Cable	1
21	2	221-3004	Front Peda1 I/F Cable	1
22	2	221-3005	Back Peda1 I/F Cable	1
23	2	221-3016	2nd Safety SW Cable	1
24	2	221-3018	Logic_BD Power Cable	1
25	2	221-3012	Table Control Cable (1)	1
26	2	221-3017	Table Control Cable (2)	1
27	2	221-3013	Table Locks Cable (1)	1
28	2	221-3014	Table Locks Cable (2)	1
29	2	221-3015	Dis_SW Cable	1
30	2	221-3025	Emerg. SW Cable	1
31	1	600-3033	Wall Stand Power OFF Lock Power Cable	1
32	N	2365706	MX100 tube fan power cable	1
33	1	2259298-66	Table grounding cable	1
34	1	2267582	Cable Conceal Assembly (Long)	1
35	1	2267582-2	Cable Conceal Assembly (Short)	1
36	1	221-2892	Cabinet grounding cable (4)	1

37	1	5166224	Cassette Size Sensing cable	1
38	1	5166260	Power cable	1
39	1	5166654	24m Interconnecting cable for AID Ion Chamber	1

Item #	FRU Level	GPCP NO.	Description	Quan.
Software Application				
1	1	5252165	Proteus SW 2.15 update to 2.16	1
2	1	5234987	Proteus SW 2.15VA update to 2.16VA	1

Illustration 1-1

Table Illustrated Parts (1)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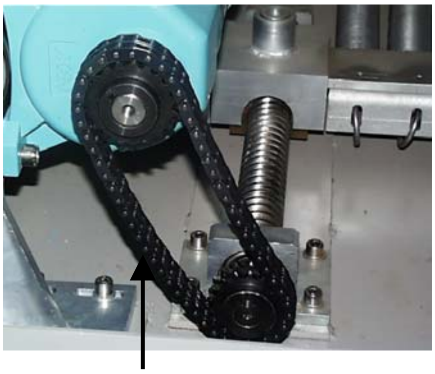
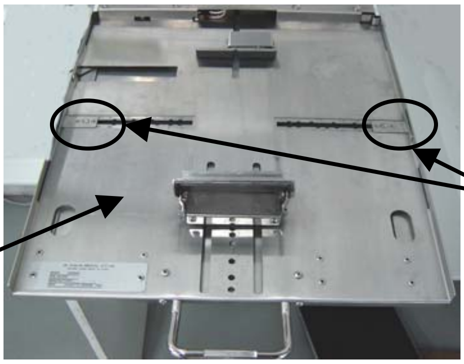
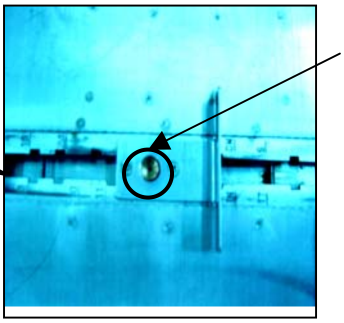
Item#48,49
Item# 8
Item# 2
Item# 6
Item# 5
Item# 4



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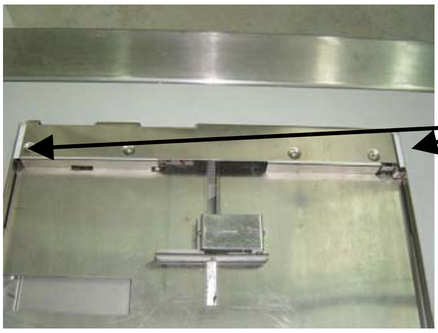
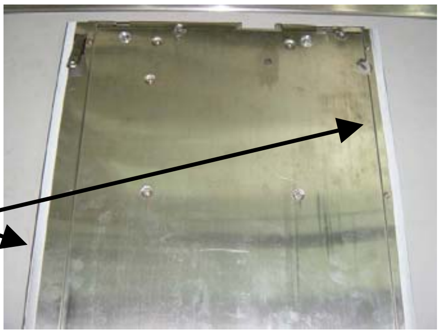




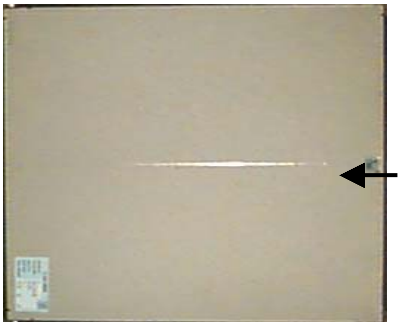
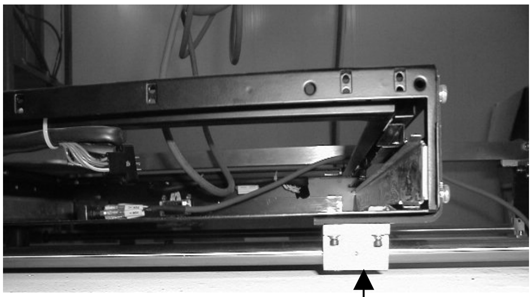


Illustration 1-2

Table Illustrated Parts (2)



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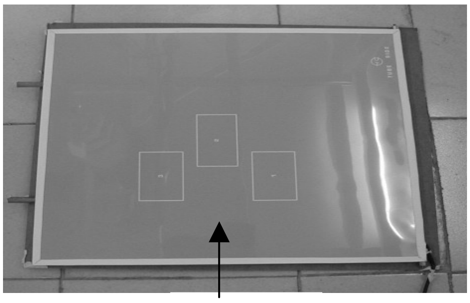

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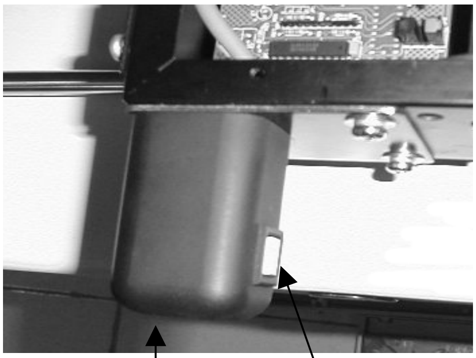

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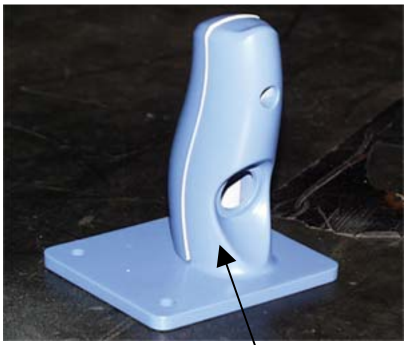
Item# 17



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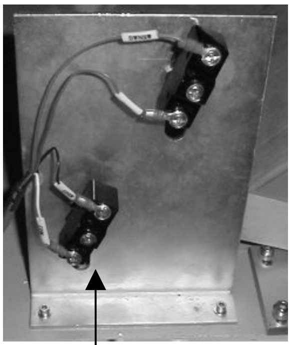

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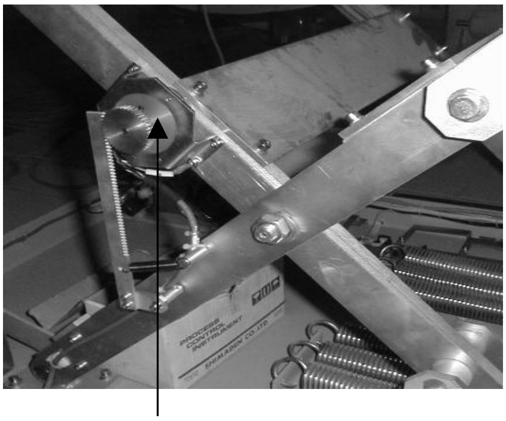

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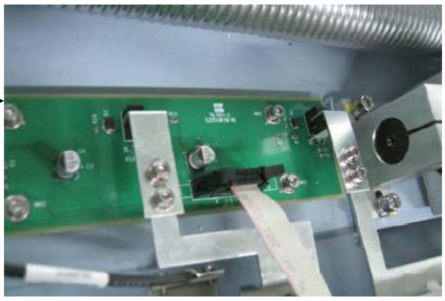
Item #22



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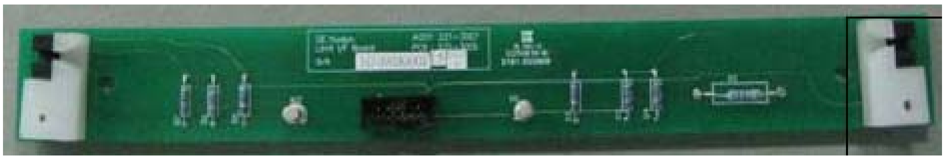
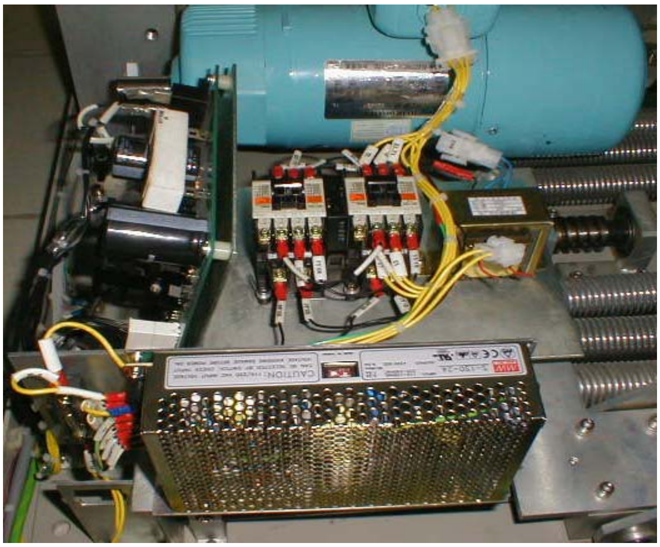
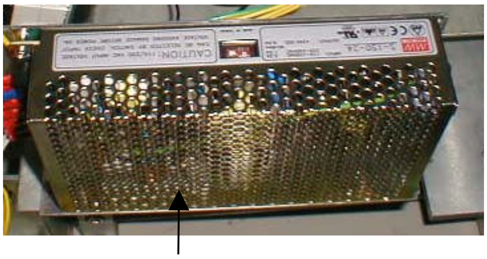


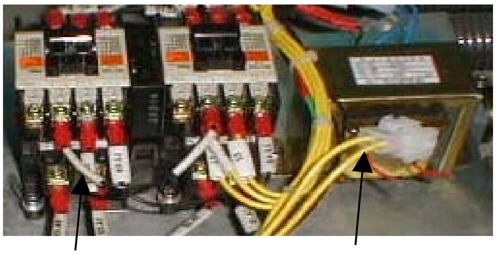
Illustration 1-3

Table Illustrated Parts (3)



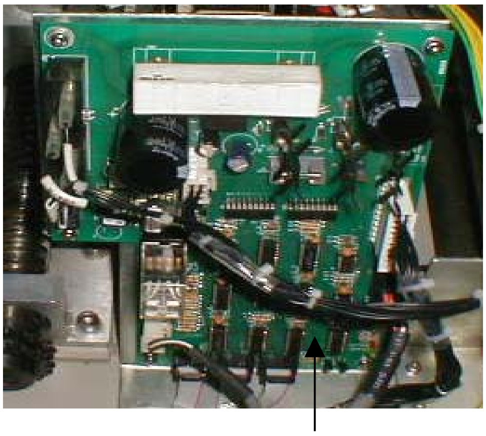


Item# 24

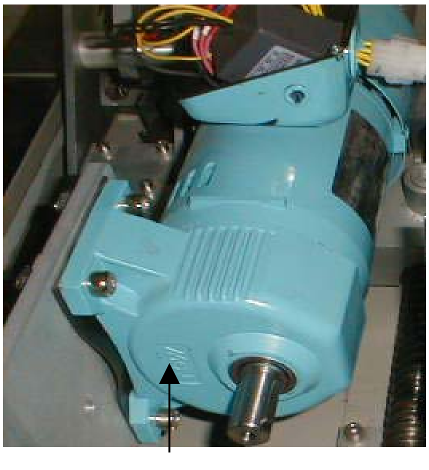


Item# 25

Item# 26



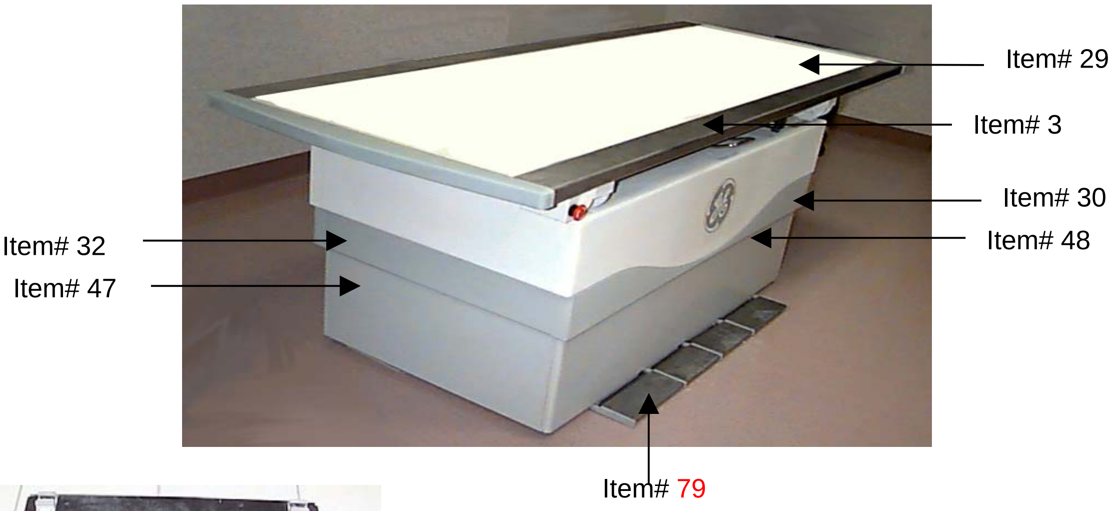
Item# 27

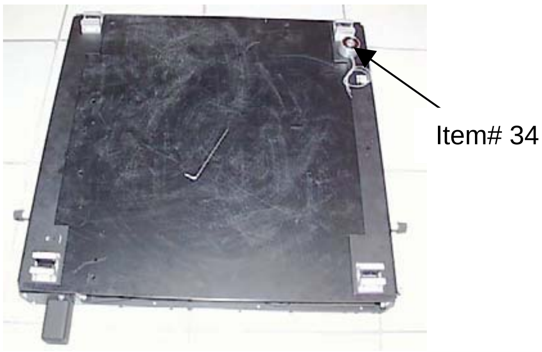


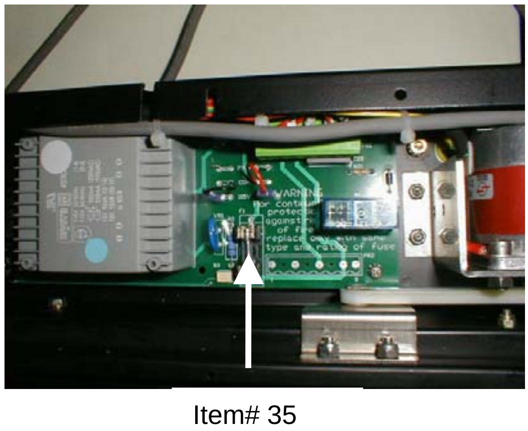
Item# 28

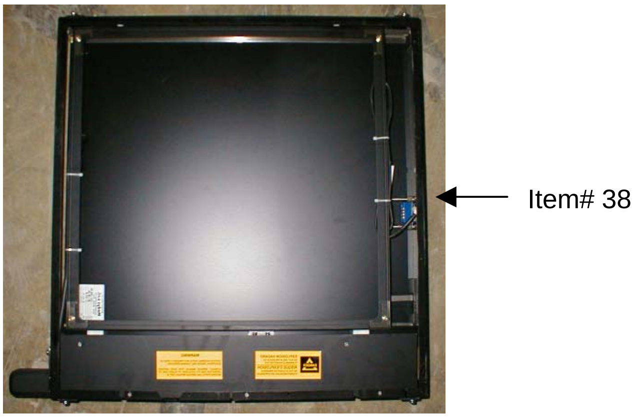
Illustration 1-4

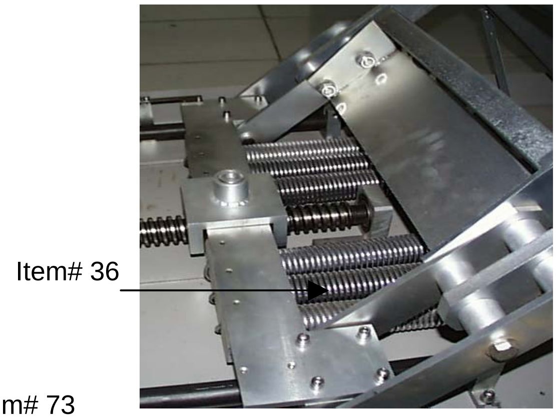
Table Illustrated Parts (4)

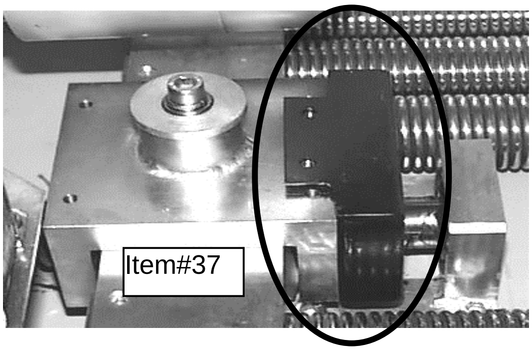

Item# 29
Item# 3
Item# 30
Item# 48
Item# 32
Item# 47
Item# 79











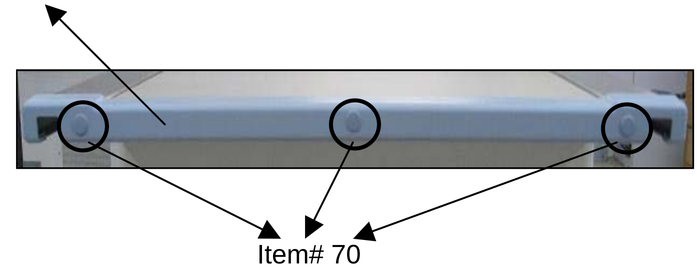
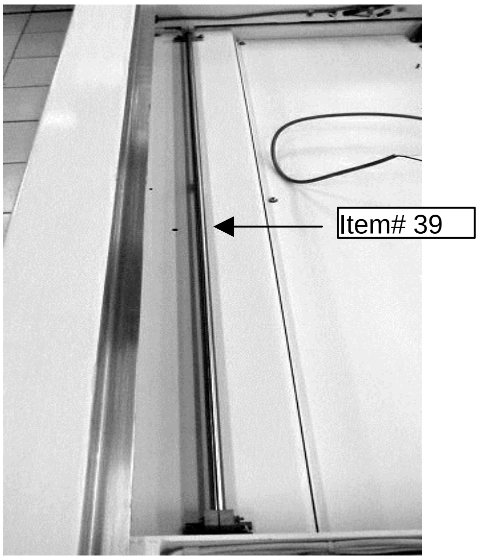
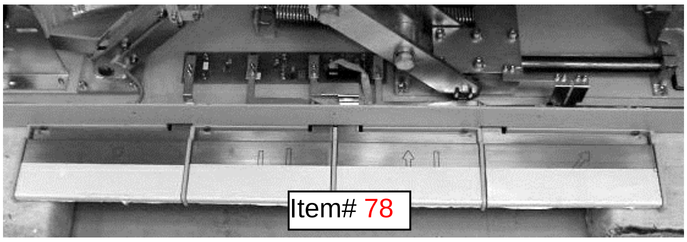
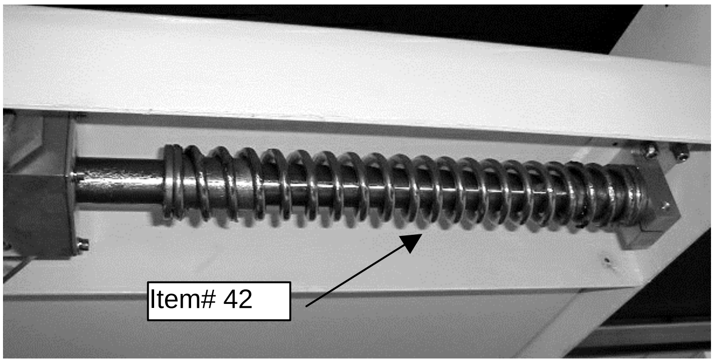

Item# 73
Item# 70

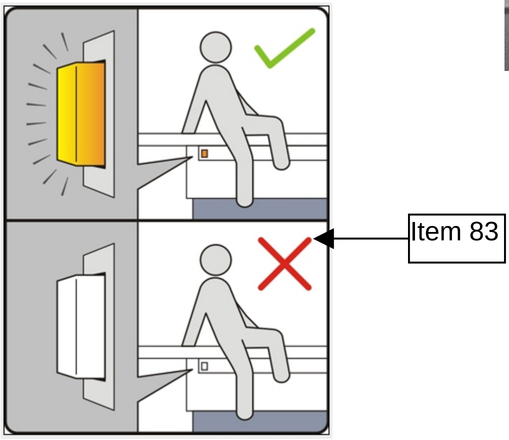
Illustration 1-5

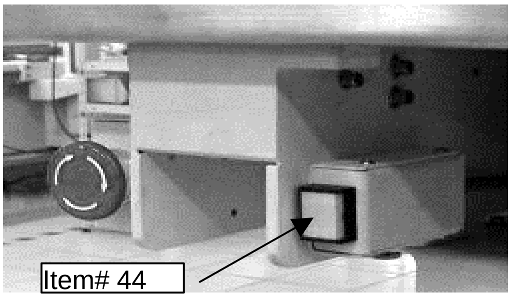
Table Illustrated Parts (5)

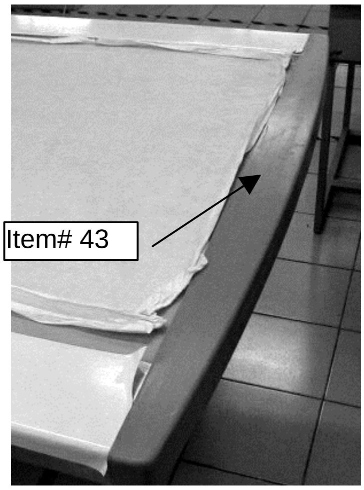


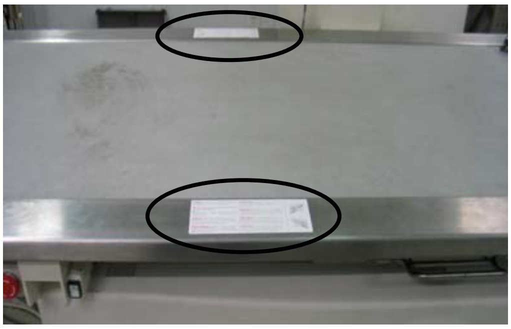




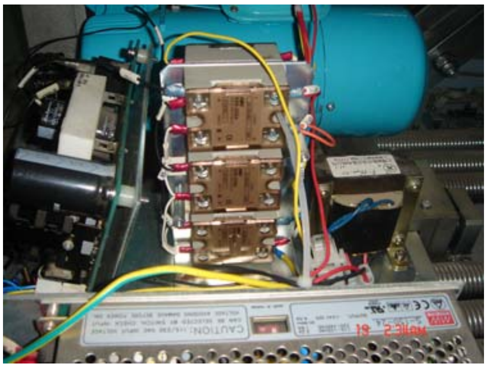








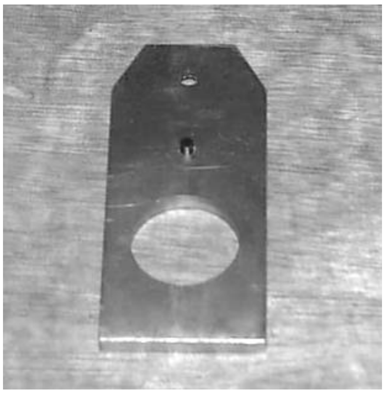
Item# 72



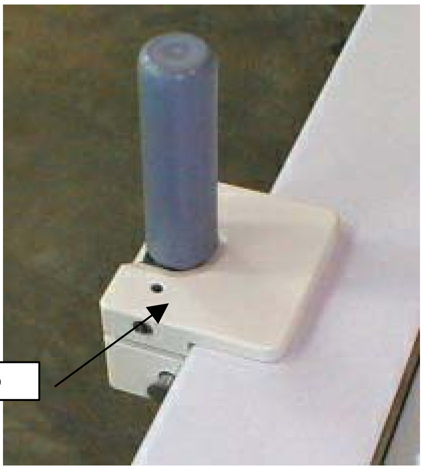
Item # 58

Illustration 1-6

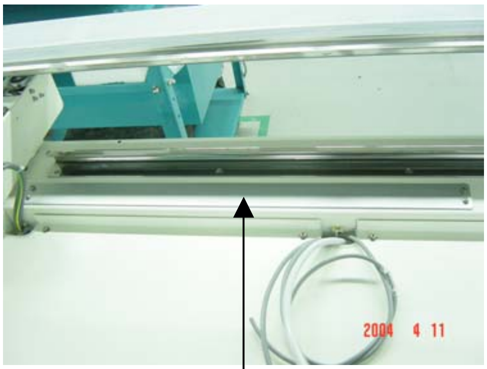
Table Illustrated Parts (6)



Item# 46



Item# 45



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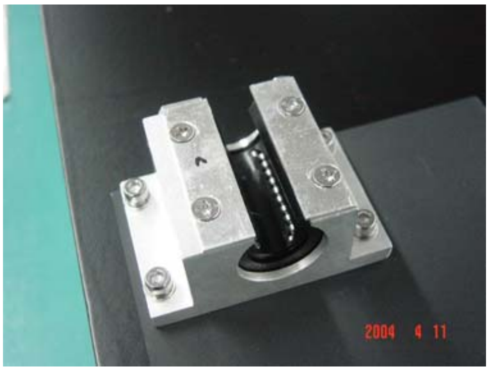
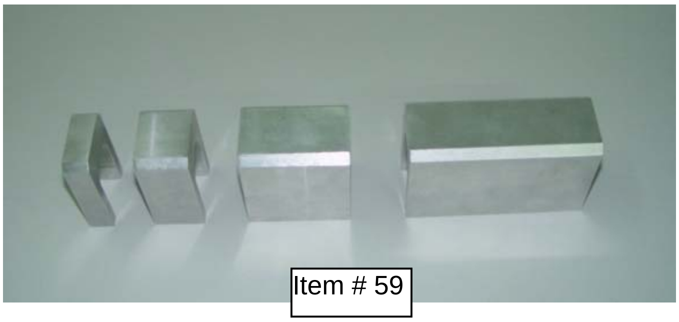
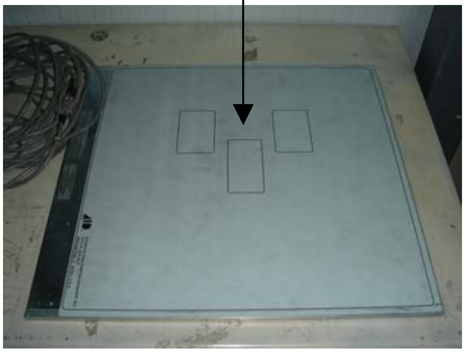


Item # 56

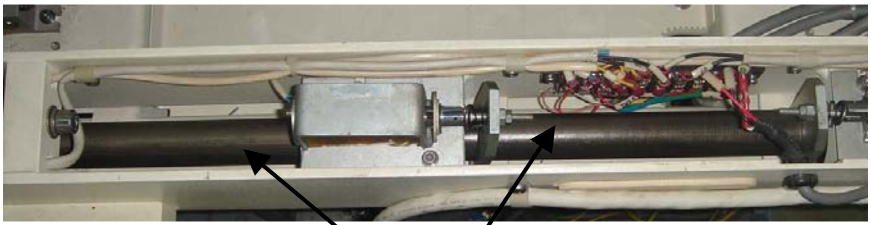


Item # 59

Item # 68



Item # 69

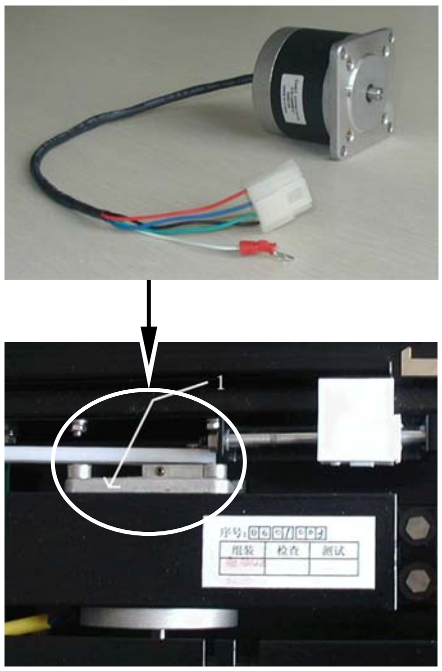


Item # 57

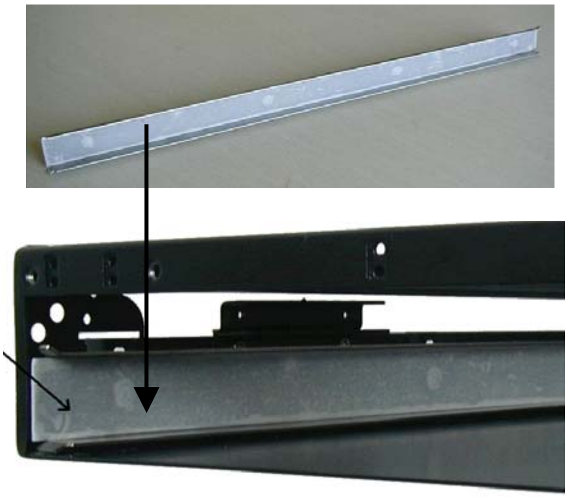
Illustration 1-7

Table Illustrated Parts (7)

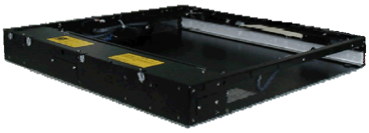
Item # 62



Item # 65

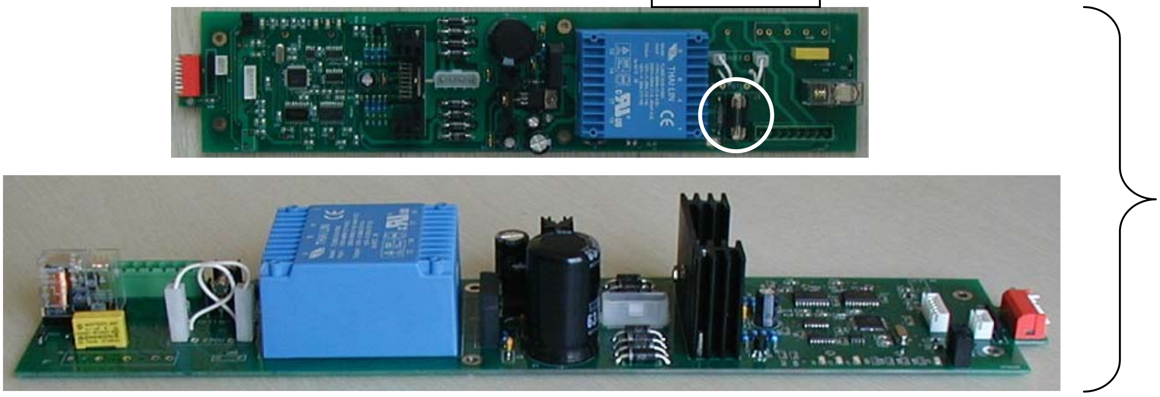


Item # 60



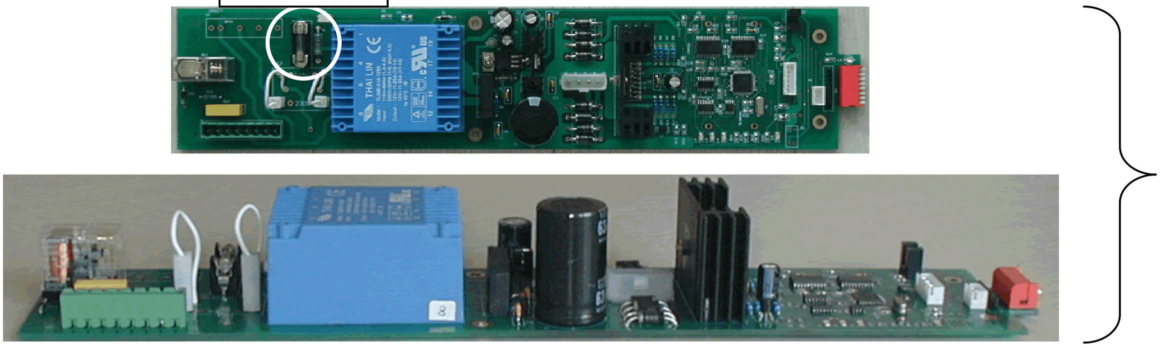
Item # 61

Item # 66/67



Item # 63

Item # 66/67



Item # 64

Illustration 1-8

Cabinet 1 Illustrated Parts (1)

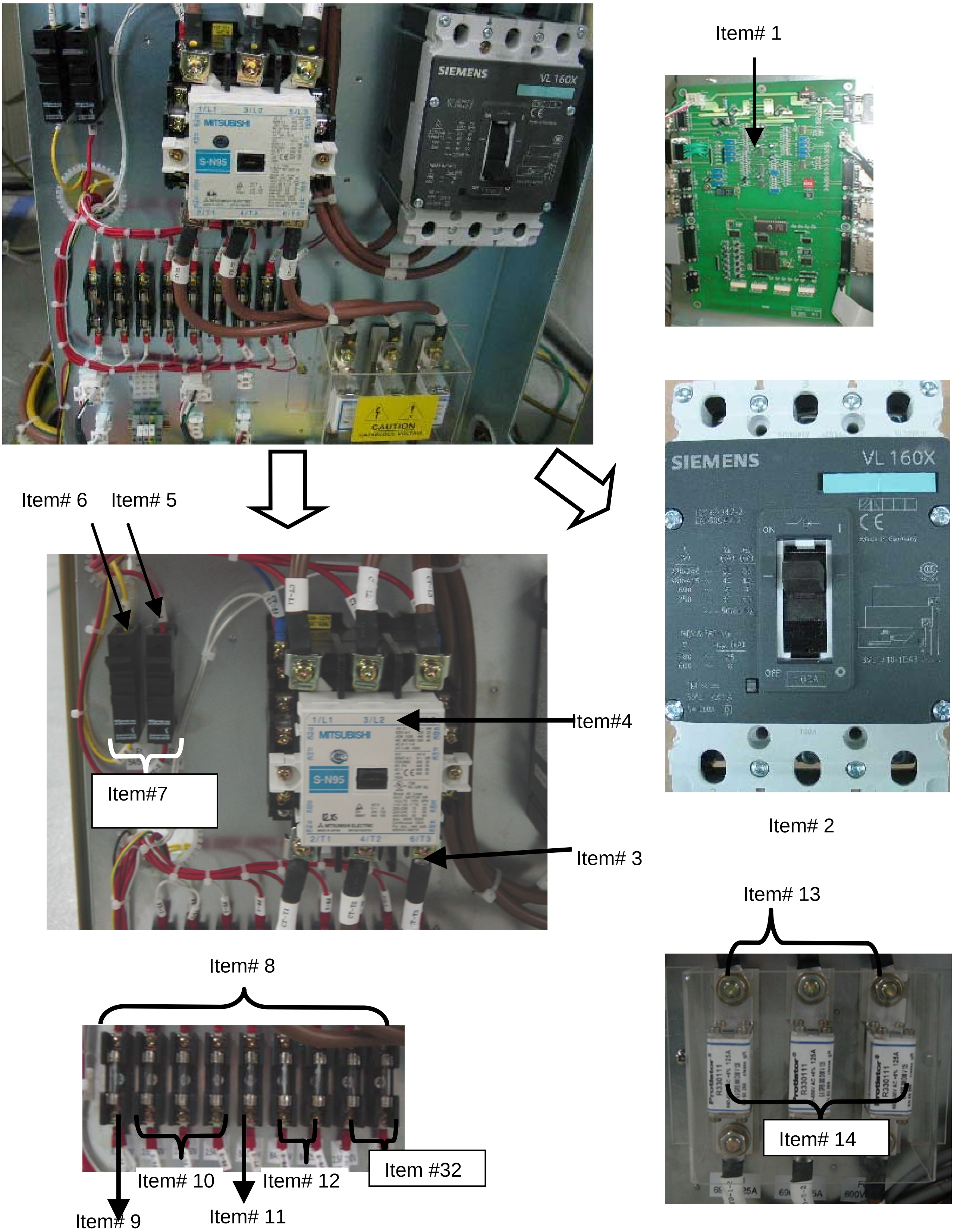

Item# 1
SIEMENS
VL 160X
MITSUBISHI
S-N95
CAUTION
Item# 6
Item# 5
Item#4
Item#7
Item# 2
Item# 3
Item# 13
Item# 8
Item# 14
Item# 10
Item# 12
Item #32
Item# 9
Item# 11

Illustration 1-9

Cabinet 1 Illustrated Parts (2)

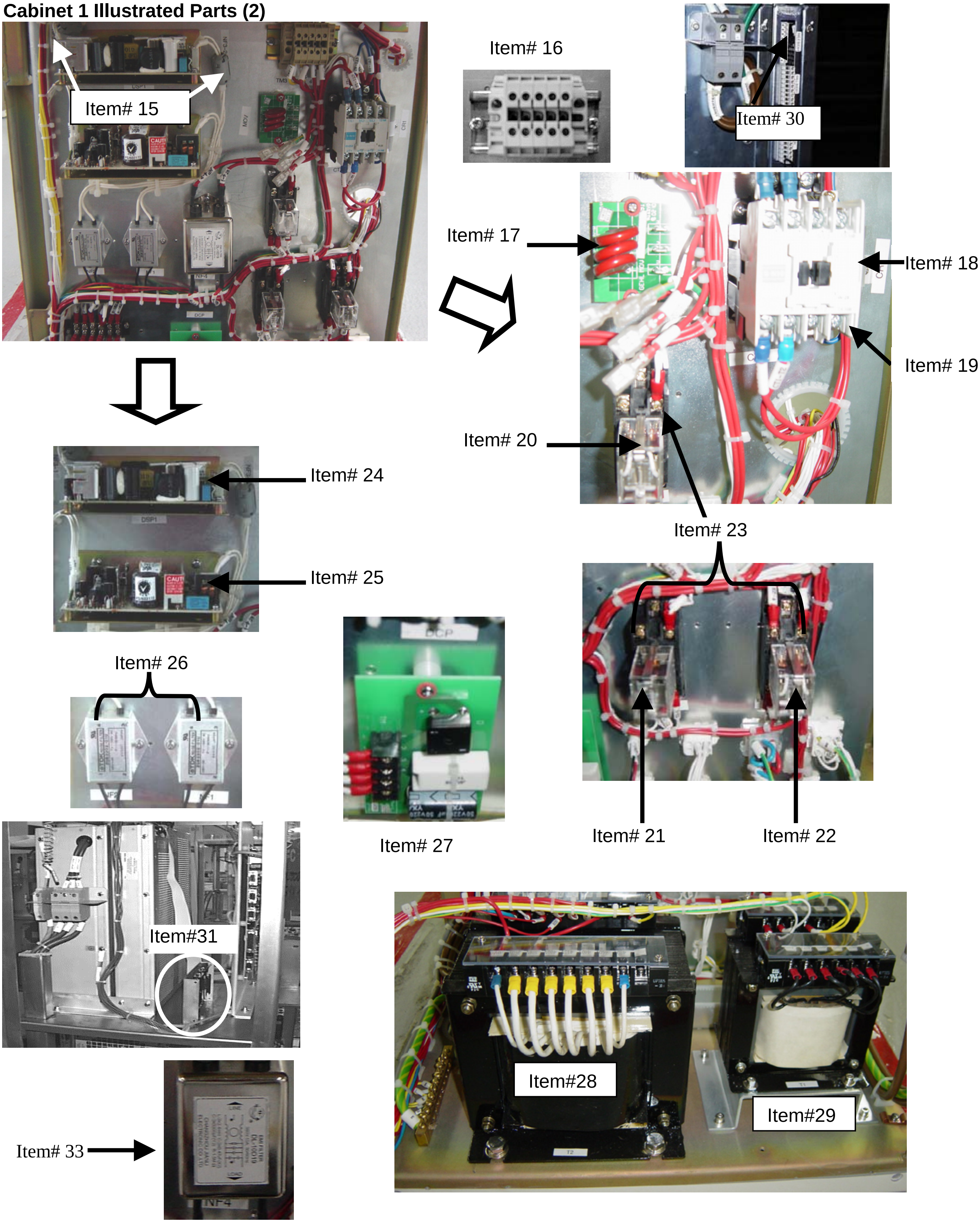

Item# 15
Item# 16
Item# 30
Item# 17
Item# 18
Item# 19
Item# 20
Item# 24
Item# 23
Item# 25
Item# 26
Item# 27
Item# 21
Item# 22
Item#31
Item# 33
Item#28
Item#29

Illustration 1-10
Cabinet 2 Illustrated Parts (1)

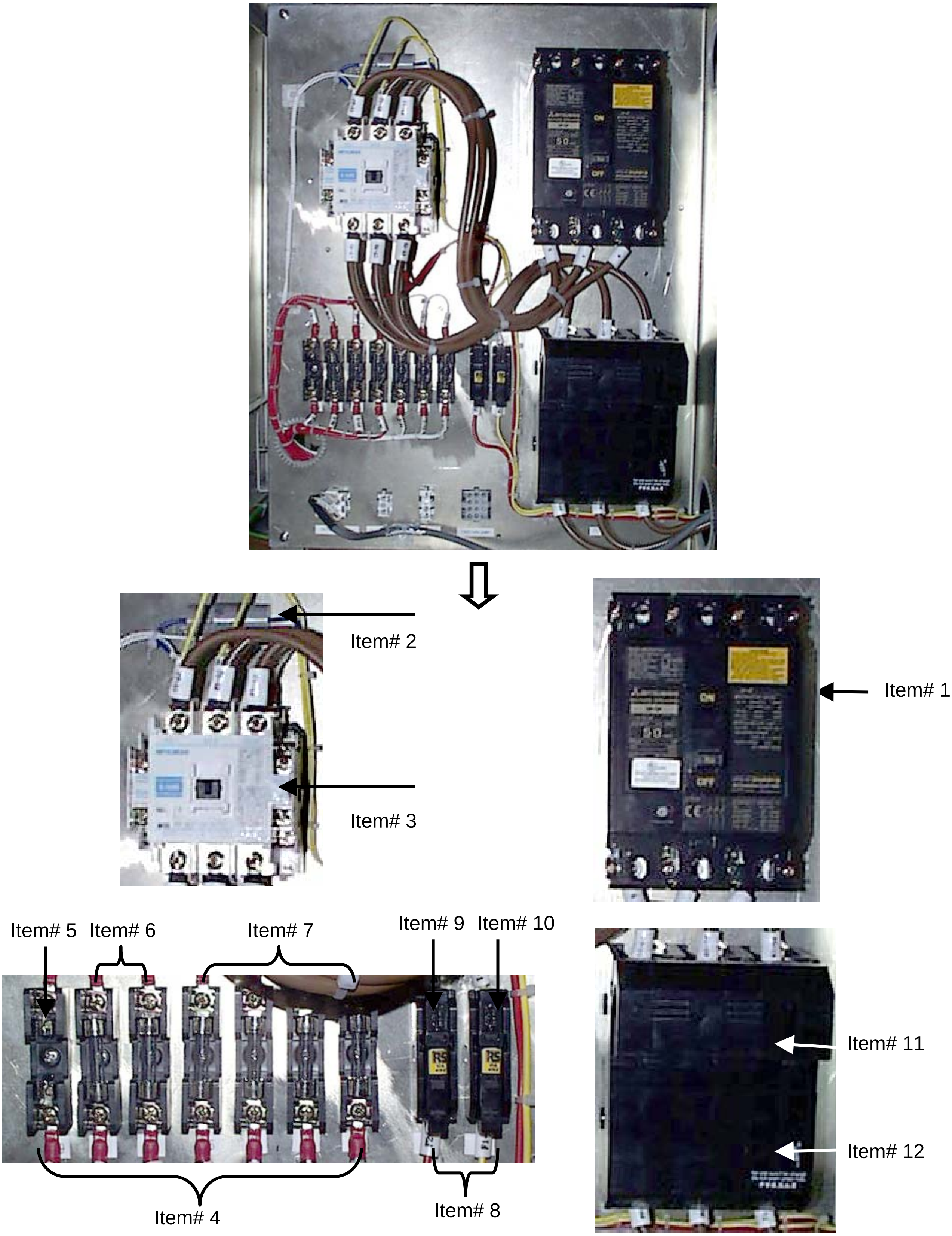

Item# 2
Item# 3
Item# 1
Item# 5
Item# 6
Item# 7
Item# 9
Item# 10
Item# 11
Item# 12
Item# 4
Item# 8

Illustration 1-11

Cabinet 2 Illustrated Parts (2)

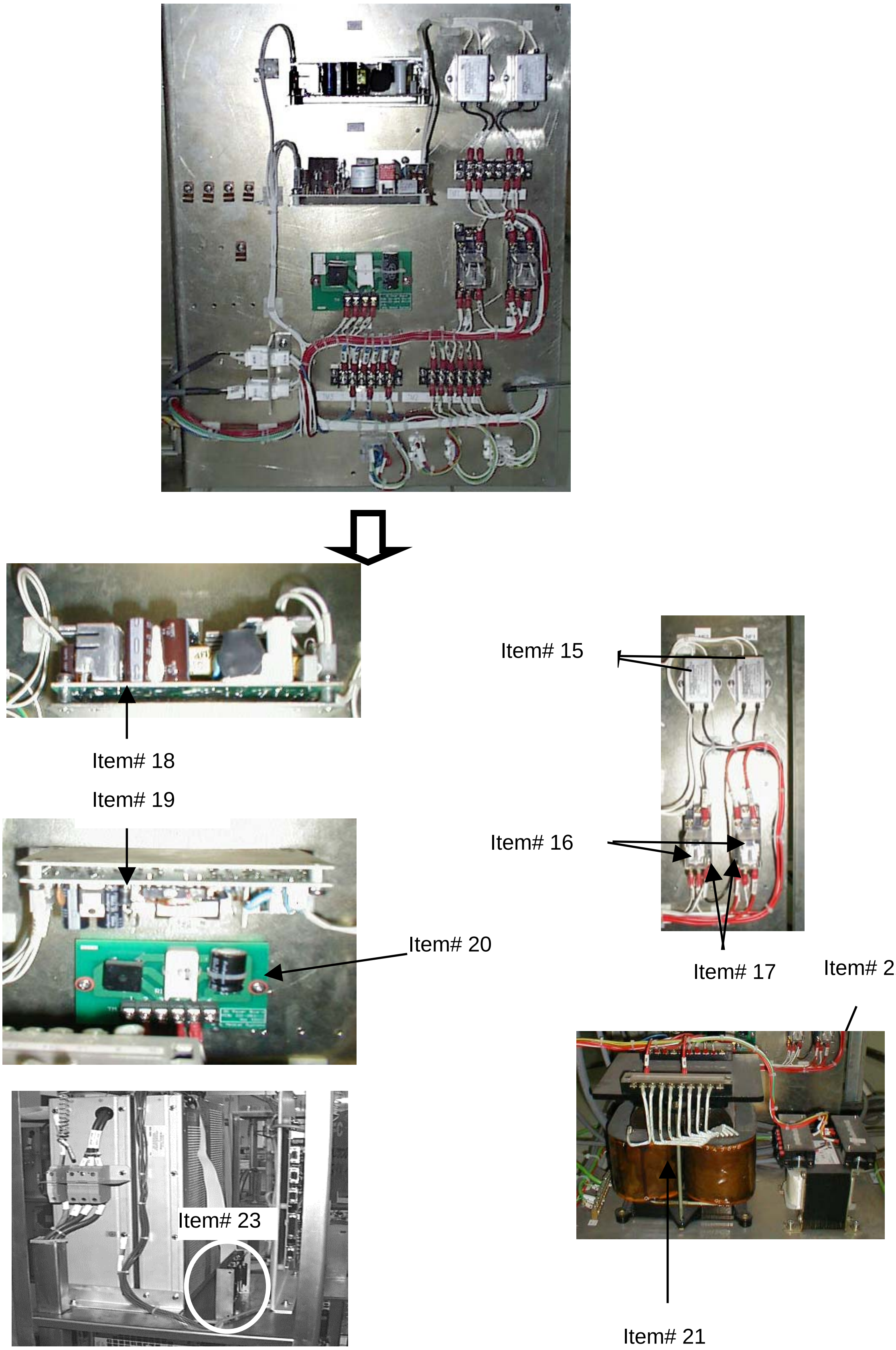
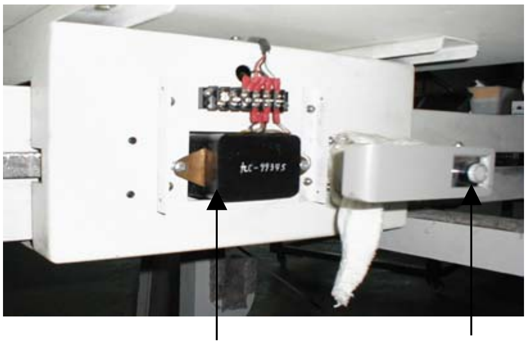

Item# 15
Item# 18
Item# 19
Item# 16
Item# 20
Item# 17
Item# 22
Item# 23
Item# 21

Illustration 1-12

Wall Stand Illustrated Parts (1)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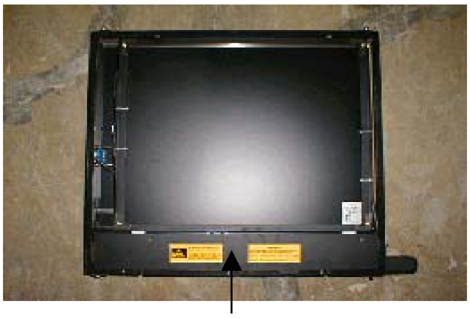
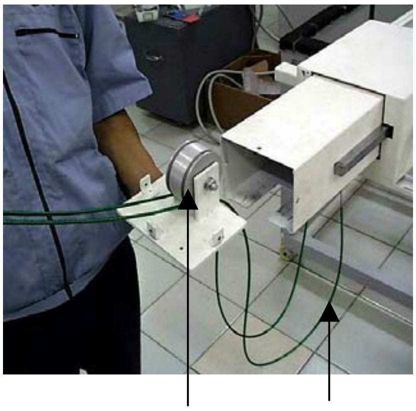
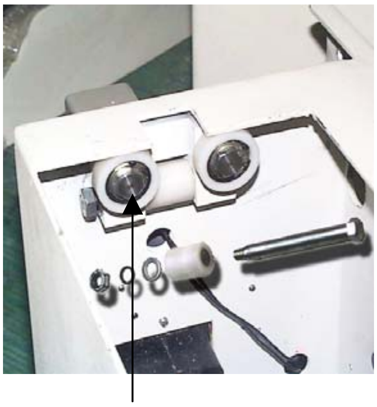
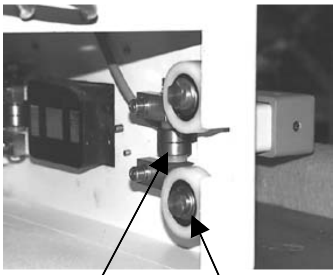
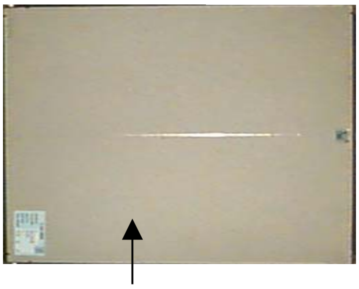
Item # 2

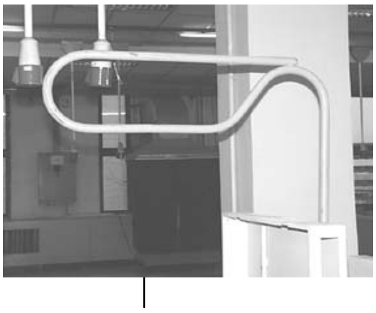


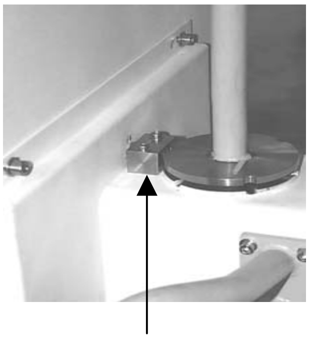

Item# 4
Item# 5, 11

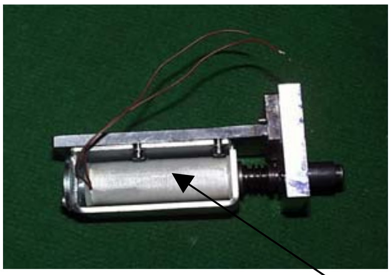


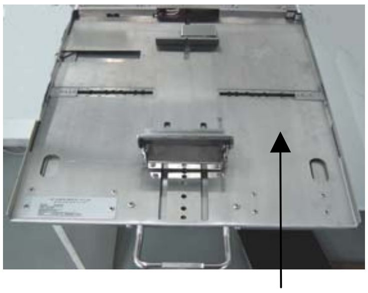

Item # 12
Item # 13

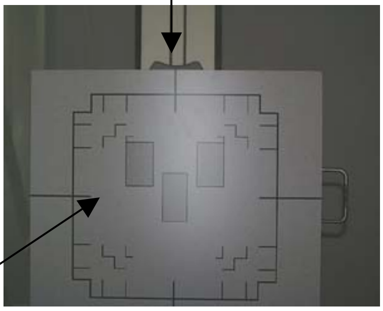











Item # 19
Item # 17

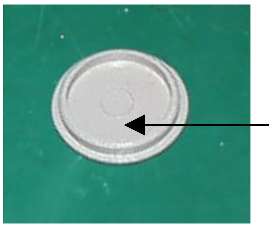
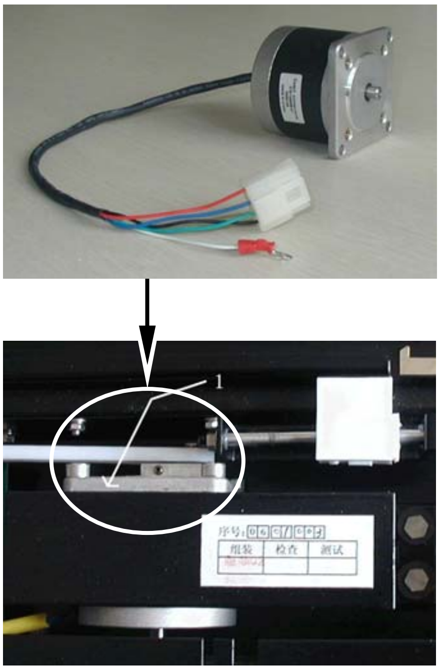
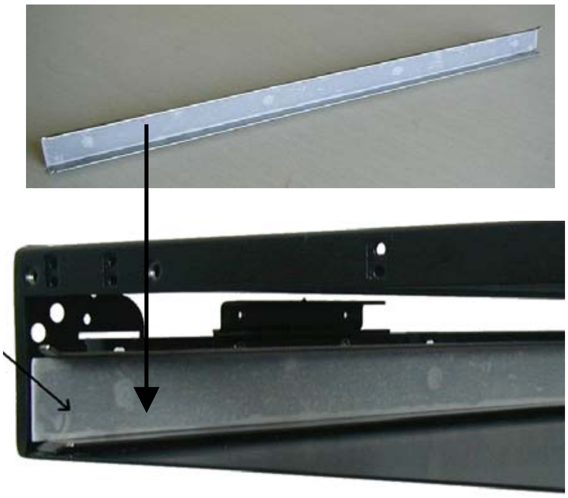


Illustration 1-13
Wall Stand Illustrated Parts (2)

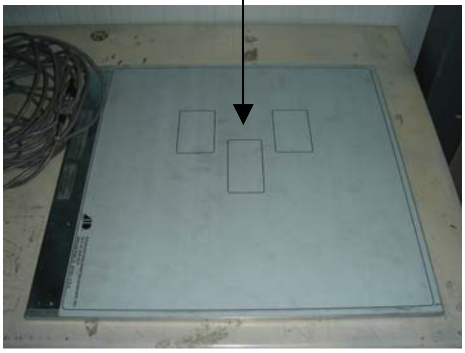
Item # 23



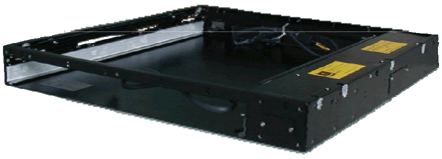
Item # 26



Item # 29



Item # 30



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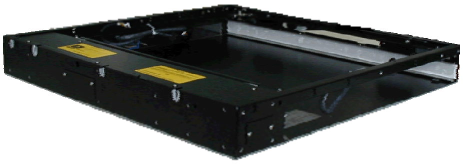
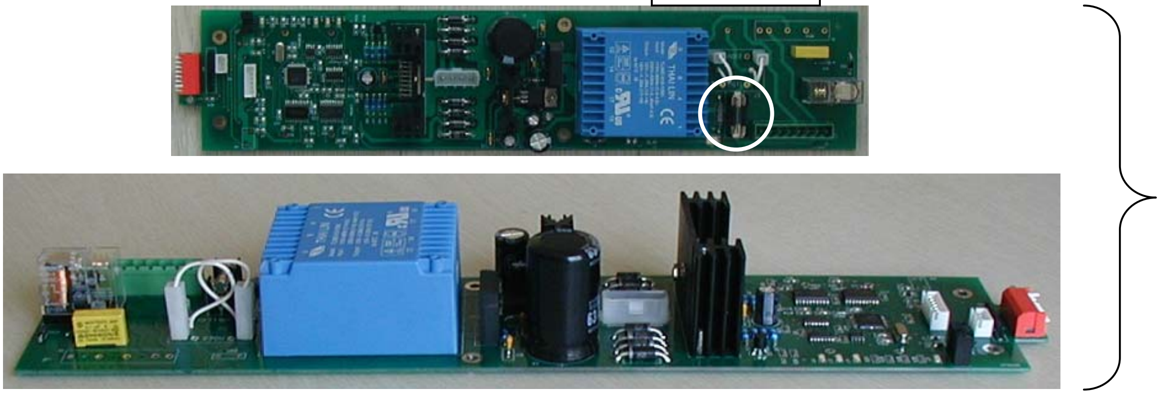


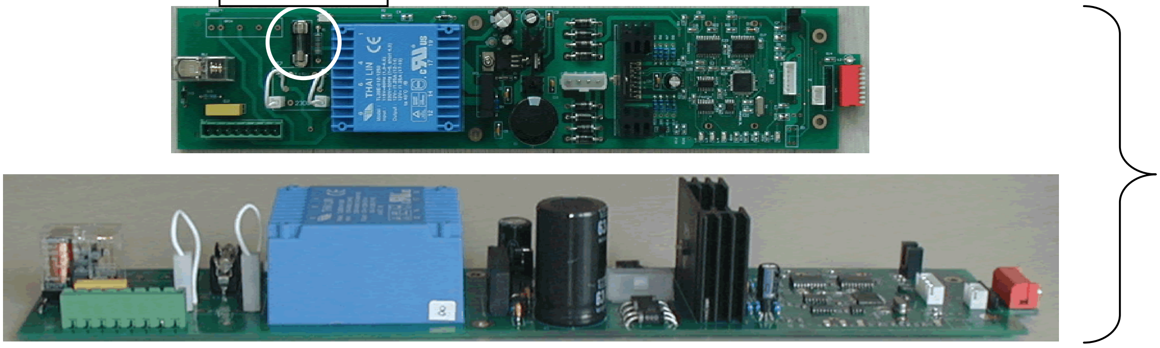
Item # 22

Item # 27/28



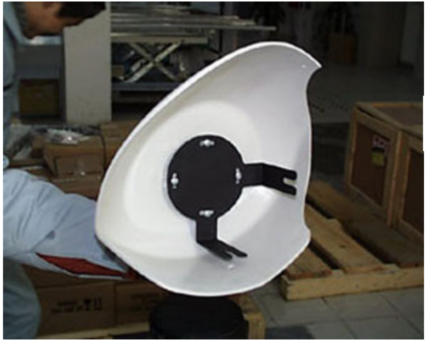
Item # 24

Item # 27/28



Item # 25

Illustration 1-14
OTS Illustrated Parts (1)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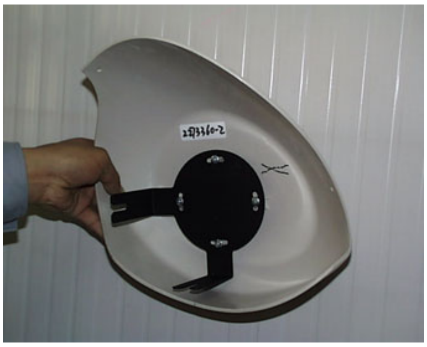
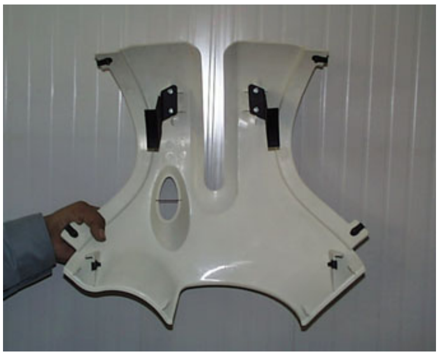


Item# 2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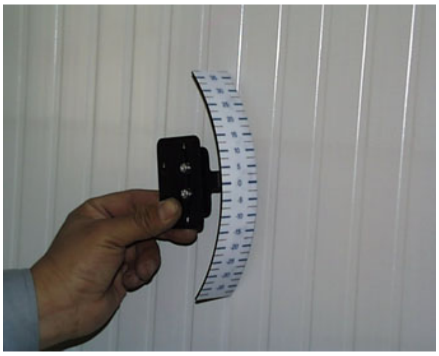
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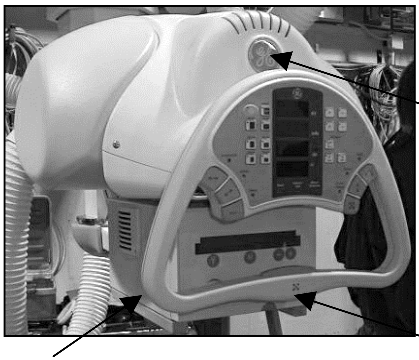
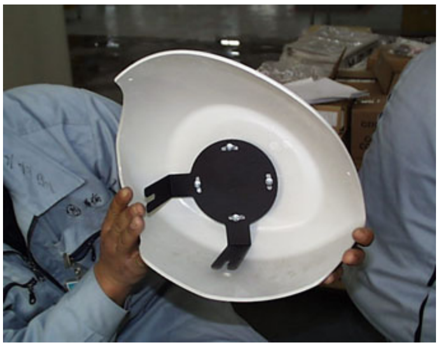

Item# 54

Item# 4

Item# 6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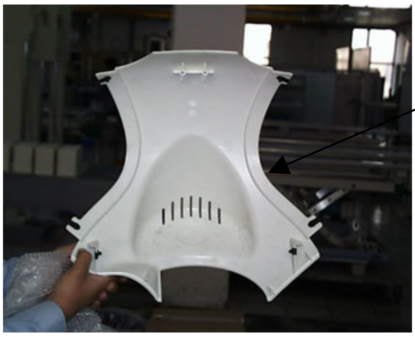

Item# 53

Item# 8

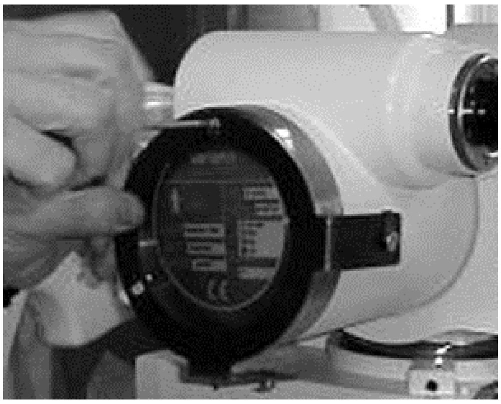
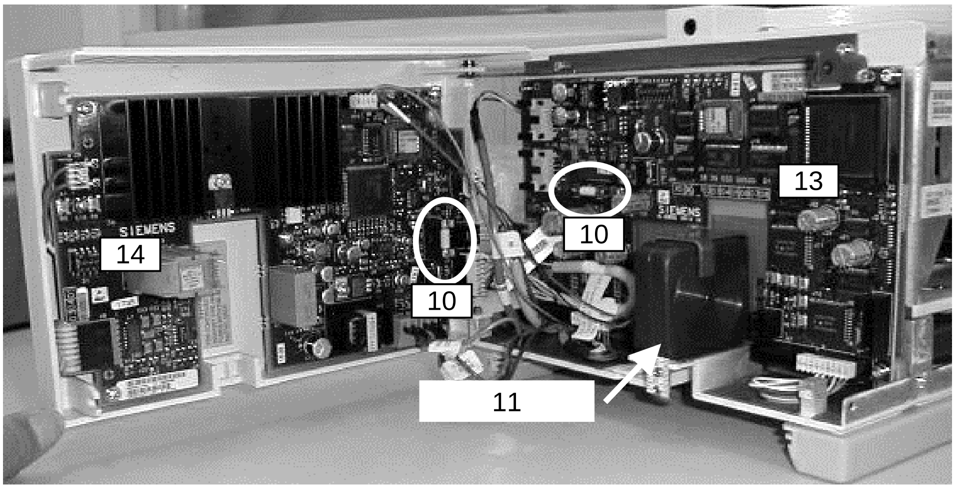
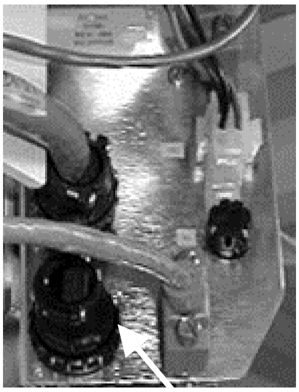
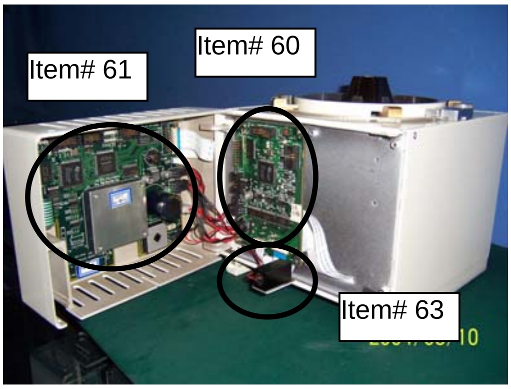
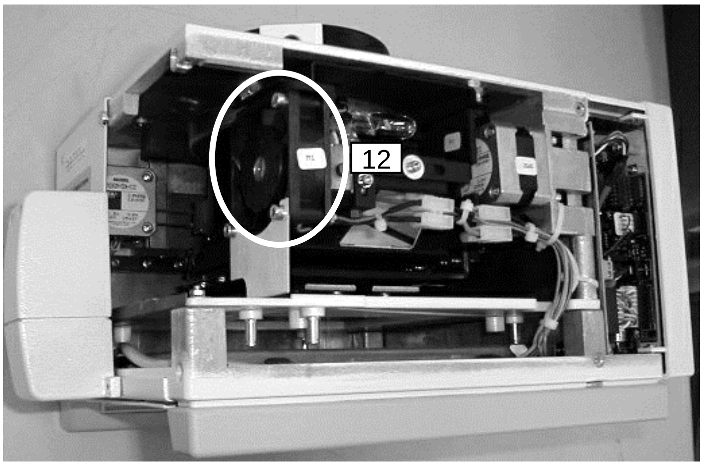

Item# 52

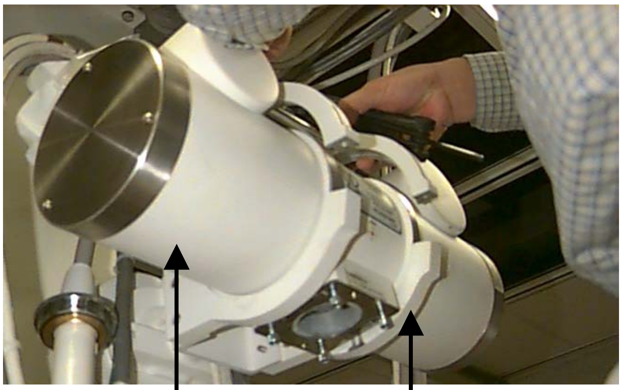
Illustration 1-15
OTS Illustrated Parts (2)

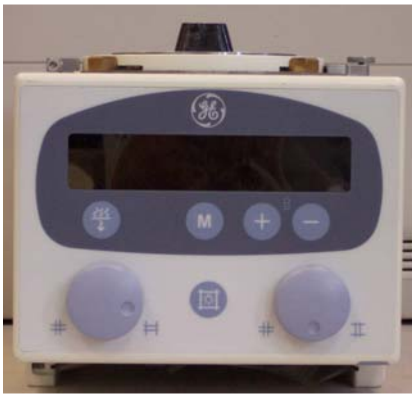

14
10
10
13
11

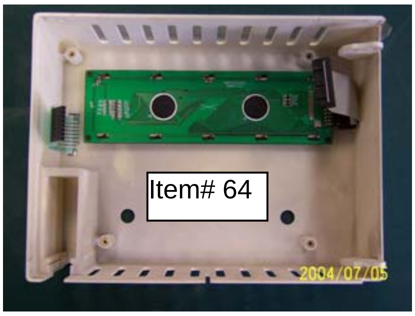



Item# 61
Item# 60
Item# 63




Item# 15
Item# 16 & 17





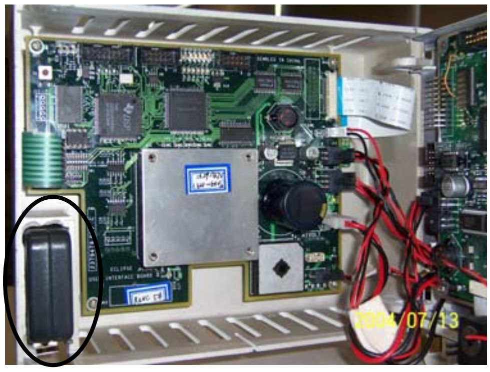
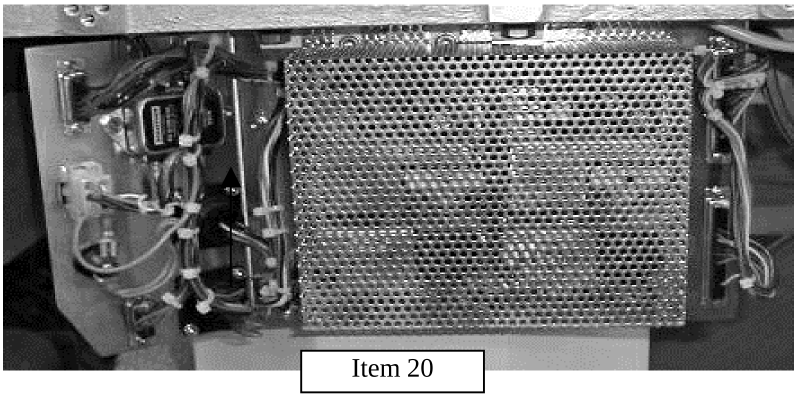
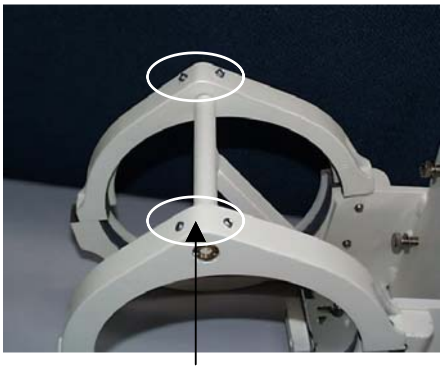
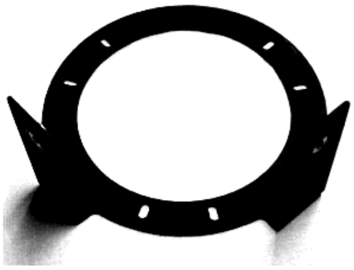


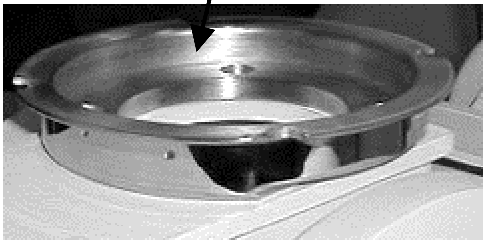
Illustration 1-16

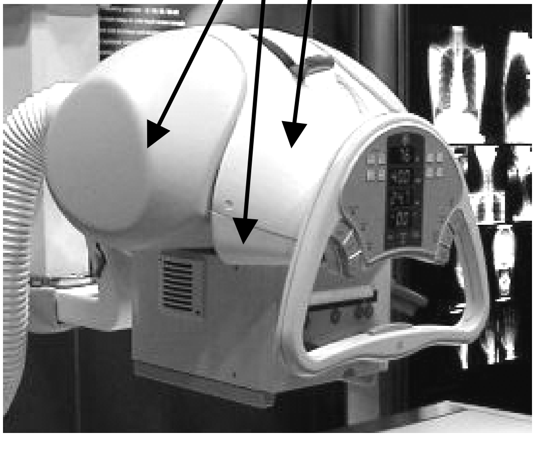
OTS Illustrated Parts (3)

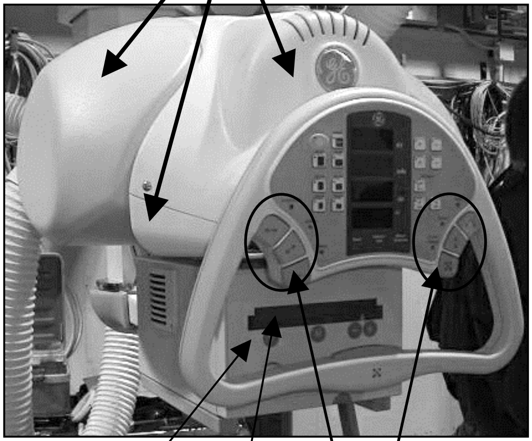











Item# 23
Item# 34
Item# 35
Item# 29

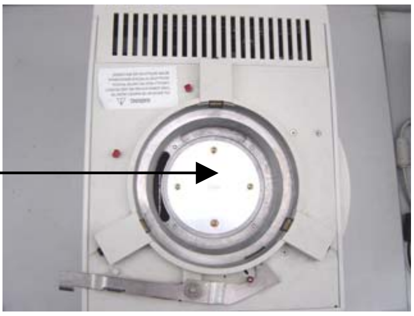
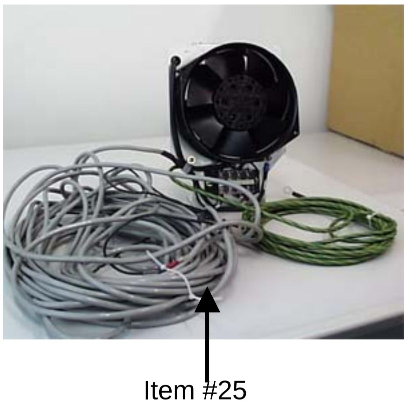
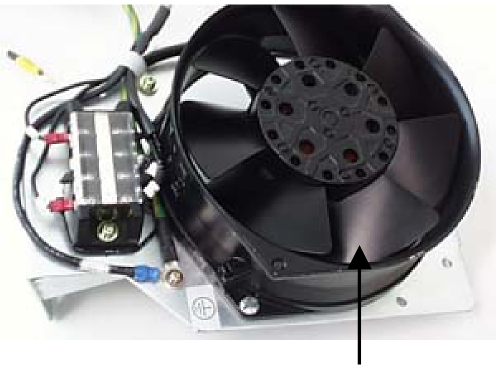
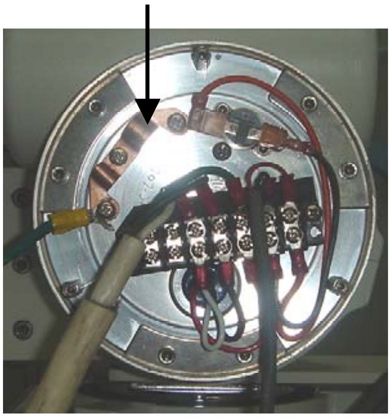


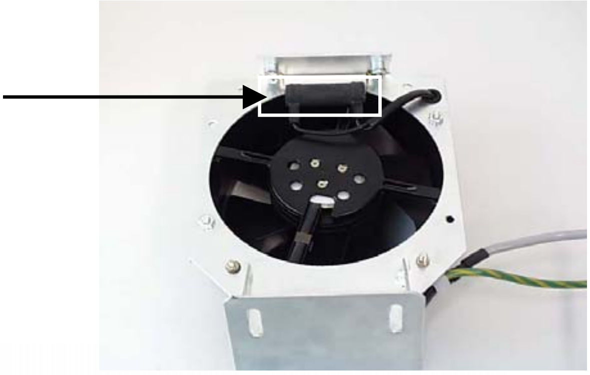
Illustration 1-17

OTS Illustrated Parts (4)









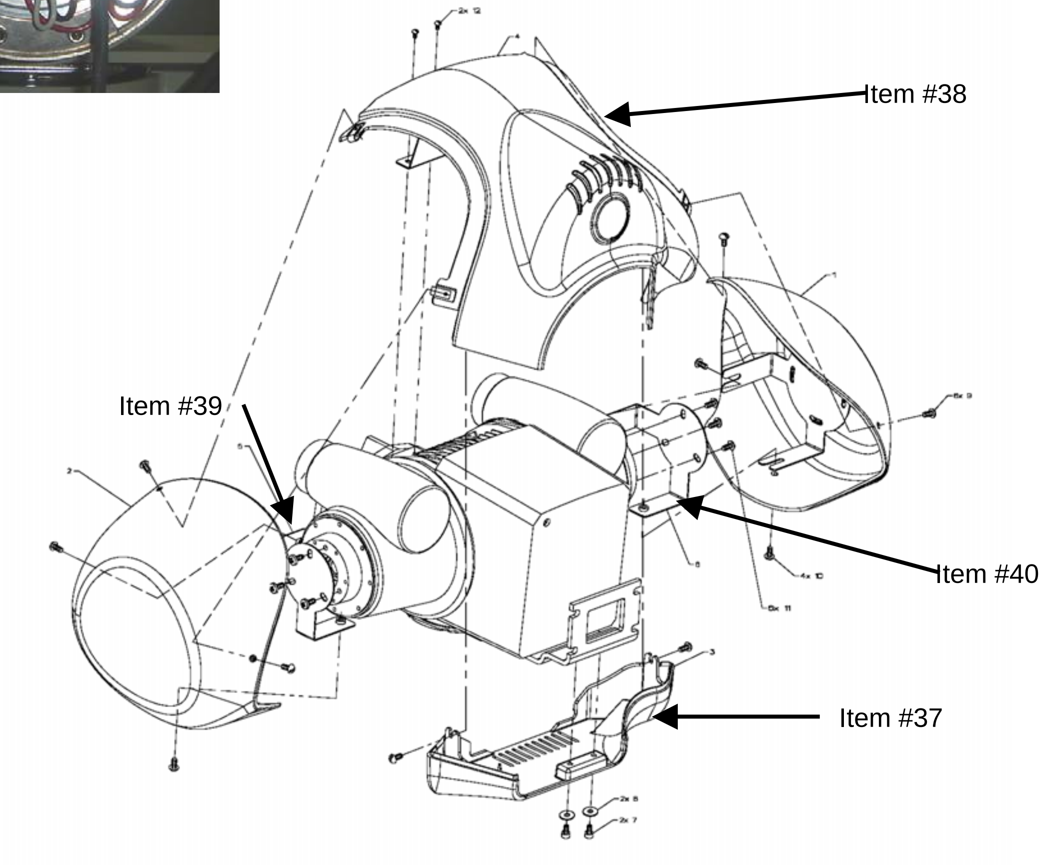

Item #38
Item #39
Item #40
Item #37

Illustration 1-18

OTS Illustrated Parts (5)

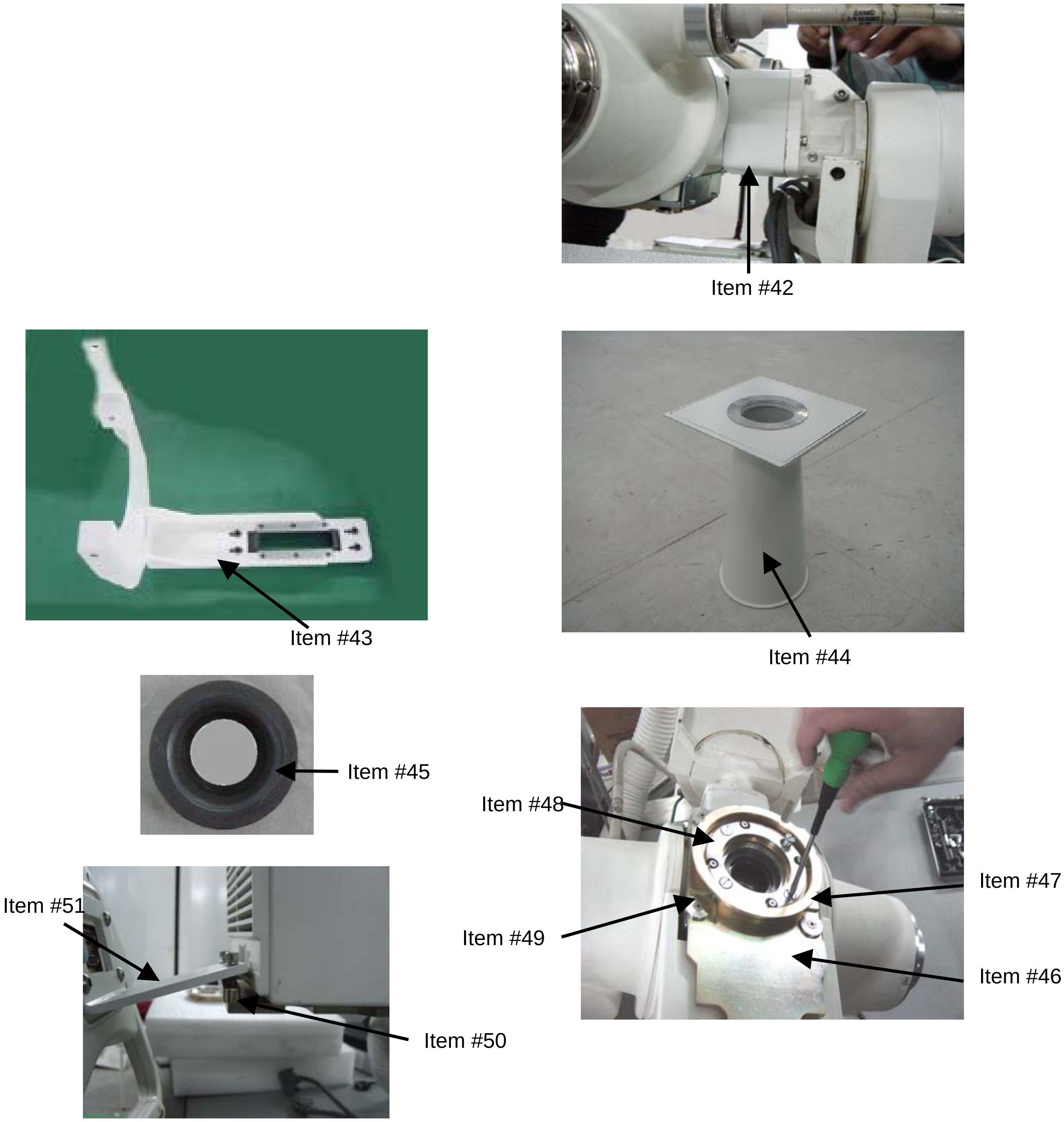
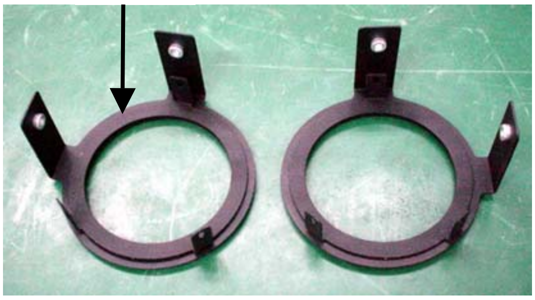

Item #42
Item #43
Item #44
Item #45
Item #48
Item #47
Item #51
Item #49
Item #46
Item #50

Illustration 1-19

OTS Illustrated Parts (6)



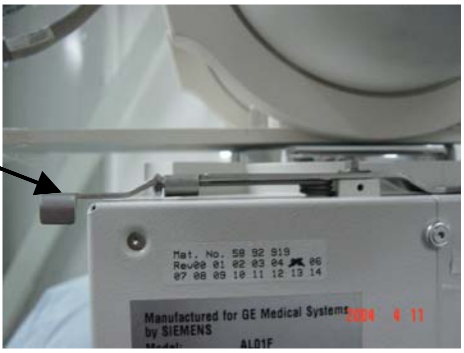
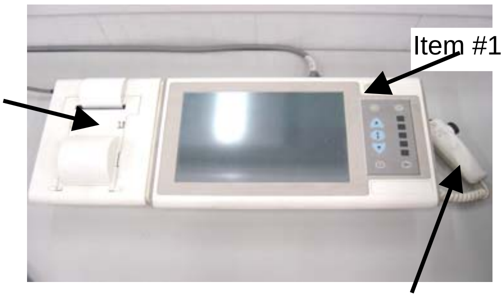
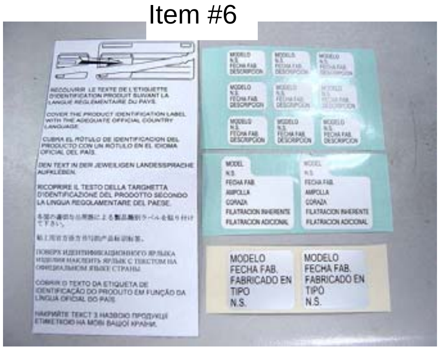

Item #57
Mat. No. 58 92 919
Manufactured for GE Medical Systems
by SIEMENS
AL01F

Illustration 1-20

Console Illustrated Parts


Item #1
Item #2
Item #4


Item #6
MODELO
FECHA FAB.
FABRICADO EN
TIPO
N.S.

SECTION 2
JEDI GENERATOR RENEWAL PARTS

2-1 Introduction

This section provides information for the identification of Renewal Parts for the Jedi 50Plus R1T generator

WARNING

BEFORE ORDERING A SPARE PART, BE SURE TO KNOW THE JEDI GENERATOR YOU HAVE ON SITE.

The model number of the Jedi generator is localized on rating plate on Auxiliary module (see page 10-24 Jedi Generator Illustration: labelling)

If the model number is 2244165 you have a JEDI 50plus R 1T.

If the model number is 2268970 you have a JEDI 80 R 1T

Order the spare part according to the JEDI generator you have.

If only one part number is written order this one, otherwise order the spare part according to your generator

CAUTION

When replacing the Jedi Generator, pay attention to check the GPCP No. of the Rotation Capacitor Set of the Auxiliary Module of Jedi Generator (refer to Job Card D/R JEDI 1, D/R JEDI 17-38) and ensure its correct match with the X-ray tube type. Pay attention to download and upgrade the Jedi software (Refer to Job Card SW JEDI 7-2 in Chapter 4.).

For Rad 14,21 X-ray tube, the GPCP No. should be 2250002.

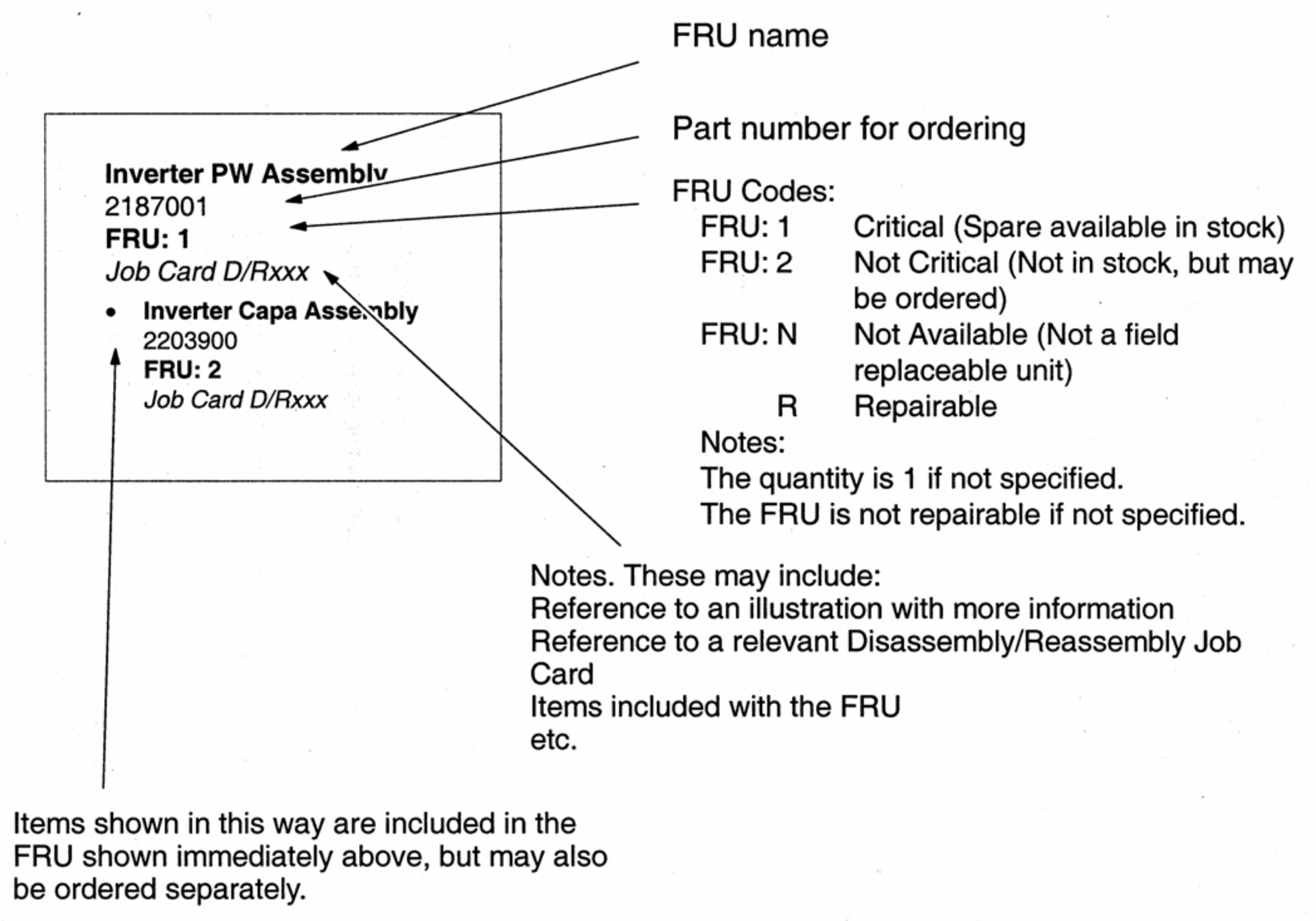
For MX100 X-ray tube, the GPCP No. should be 2215674.

Replace the Rotation Capacitor Set when necessary.

2-2 FRU Information

Information shown for each FRU (Field Replaceable Unit) is explained below.

Wherever possible, the FRU or its position is illustrated for easy indentification.



FRU name

Part number for ordering

FRU Codes:

FRU: 1	Critical (Spare available in stock)
FRU: 2	Not Critical (Not in stock, but may be ordered)
FRU: N	Not Available (Not a field replaceable unit)
R	Repairable

Notes:
The quantity is 1 if not specified.
The FRU is not repairable if not specified.

Notes. These may include:
Reference to an illustration with more information
Reference to a relevant Disassembly/Reassembly Job Card
Items included with the FRU
etc.

Items shown in this way are included in the FRU shown immediately above, but may also be ordered separately.

2-3 Renewal Parts

CAUTION

The System I/F board 2375230 can be used together with Rev2.14 or above version of the System Console Software.

The Rev 2.14 or above version of the System Console Software can be used together with either the System I/F board 2375230 (Item #1 of Cabinet 1) or the System I/F Board 2259298-45 and CAN I/F Board 2259298-46.

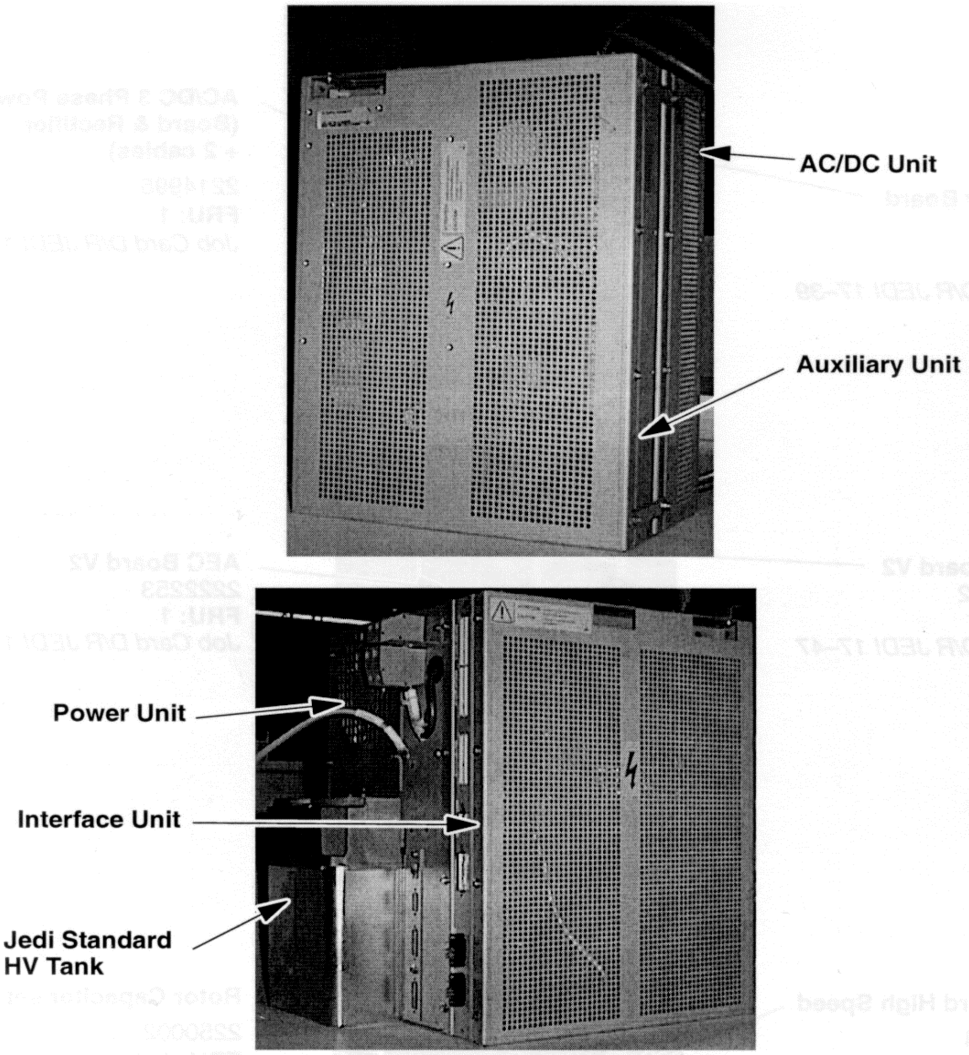
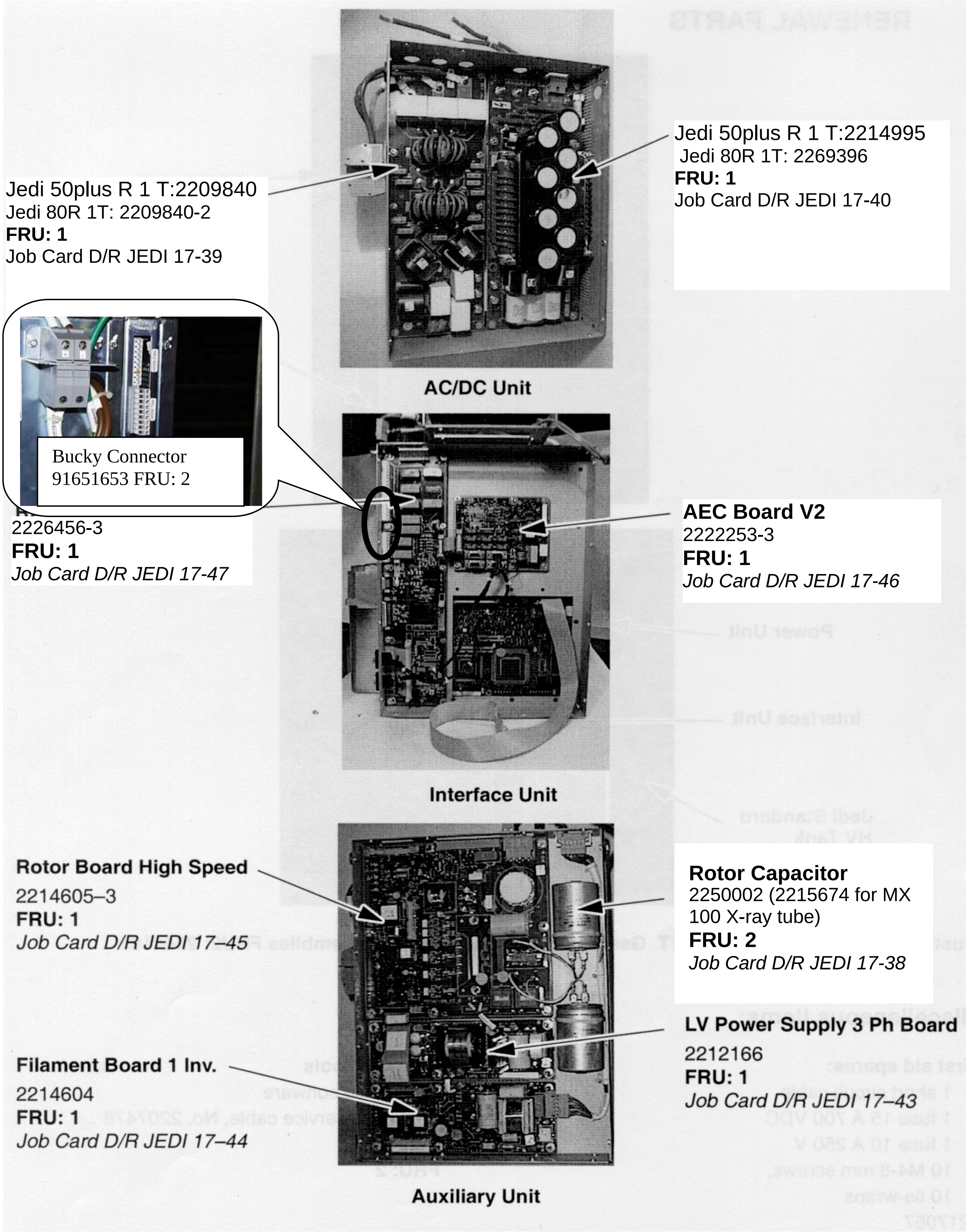


Illustration – JEDI 50Plus R 1T and JEDI 80R 1T Generator Location of Main Assemble FRU2: 2244165.

Miscellaneous Items:

First aid spares: (FRU: 1)	**GPCP No. 2217057**	**Services tools (FRU: 2)**
1 PLASTIC ZIP LOCK BAG 160X220	10 TY-WRAPS D22/L99X2.5	Service software
10 SCREW HEX FLANGE HEAD M4X8	1 SHORT CIRCUIT CABLE	9-wire serial cable, No. 2207478
SCREW HEX FLANGE HEAD 4MM 8MM	1 CONNECTORS KIT FOR FC2	For JEDI 50Plus R 1T: 2244165-2
SCREW HEX FLANGE HEAD 5 MM 12 MM	2 PLASTIC ZIP LOCK BAGS 40X60	For JEDI 80R 1T: 2268970
1 FUS FF 14X51 15A 700VDC C 50KA ULR	3 PLASTIC ZIP LOCK BAGS 80X120	
1 FUS FF 14X51 2A 700VDC C 50KA ULR	1 RECT CONNEC 9C FEM AWG14 SCREW	
1 SLOW BLOW FUSE HCP 6X32 10A 250V UL	10 SCREW HEX FLANGE HEAD 5 MM 12 MM	
1 PADDED BAG W/ ADH CLOSURE 260X370		

Illustration – JEDI 50Plus R 1T and JEDI 80R 1T AC/DC Unit, Interface Unit & Auxiliary Unit



Jedi 50plus R 1 T:2209840
Jedi 80R 1T: 2209840-2
FRU: 1
Job Card D/R JEDI 17-39

Jedi 50plus R 1 T:2214995
Jedi 80R 1T: 2269396
FRU: 1
Job Card D/R JEDI 17-40

Bucky Connector
91651653 FRU: 2

2226456-3
FRU: 1
Job Card D/R JEDI 17-47

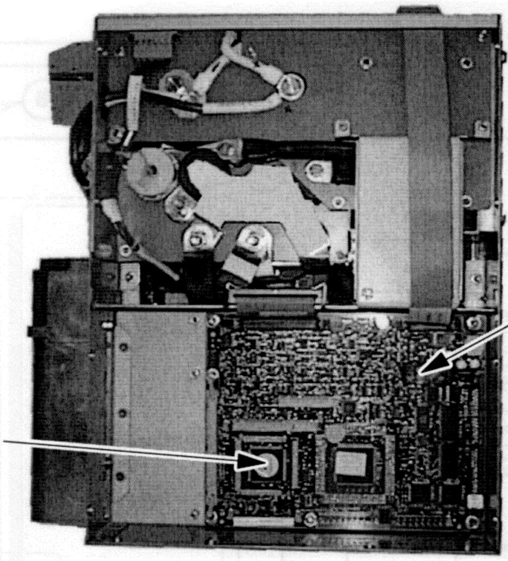
AEC Board V2
2222253-3
FRU: 1
Job Card D/R JEDI 17-46

Rotor Board High Speed
2214605–3
FRU: 1
Job Card D/R JEDI 17–45

Rotor Capacitor
2250002 (2215674 for MX 100 X-ray tube)
FRU: 2
Job Card D/R JEDI 17-38

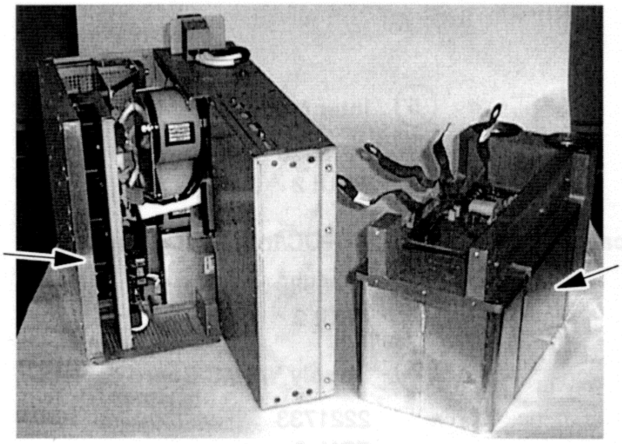
LV Power Supply 3 Ph Board
2212166
FRU: 1
Job Card D/R JEDI 17–43

Filament Board 1 Inv.
2214604
FRU: 1
Job Card D/R JEDI 17–44



Non–Volatile parameters RAM
2159419
FRU: 2
Job Card PM JEDI 15–2

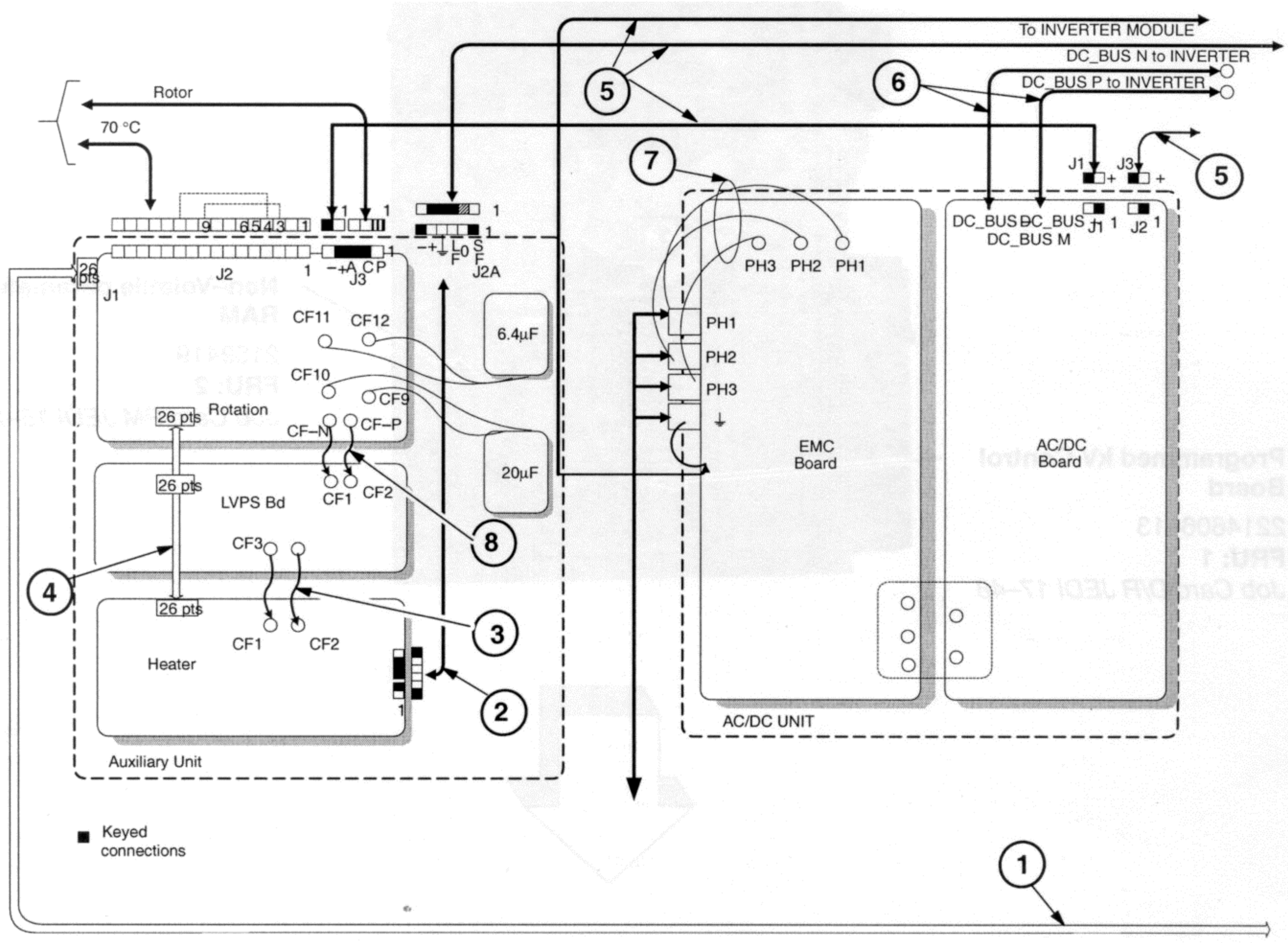
Programmed kV Control Board
2265276
FRU: 1
Job Card D/R JEDI 17–48



Inverter Power Assy
2247389 -2
FRU: 1
Job Card D/R JEDI 17–37

Jedi Standard HV Tank
2214527
FRU: 1
Job Card D/R JEDI 17–37

Illustration – JEDI 50Plus R 1T and JEDI 80R 1T Power Unit


To INVERTER MODULE
DC_BUS N to INVERTER
DC_BUS P to INVERTER
Rotor
70 °C
5
6
7
5
J1
J3
J2
J2A
26 pts
Rotation
CF11
CF12
CF10
CF9
CF–N
CF–P
6.4μF
20μF
LVPS Bd
CF1
CF2
CF3
Heater
CF1
CF2
Auxiliary Unit
4
3
8
2
PH1
PH2
PH3
PH3
PH2
PH1
EMC Board
DC_BUS
DC_BUS
DC_BUS M
AC/DC Board
AC/DC UNIT
Keyed connections
1

2-4 Cables

1 CAN cable
2249990

FRU: 2

2 Heater/AUX. Module
2215839
FRU: 2

3 K VPS-Heater strap
2215227
FRU: 2

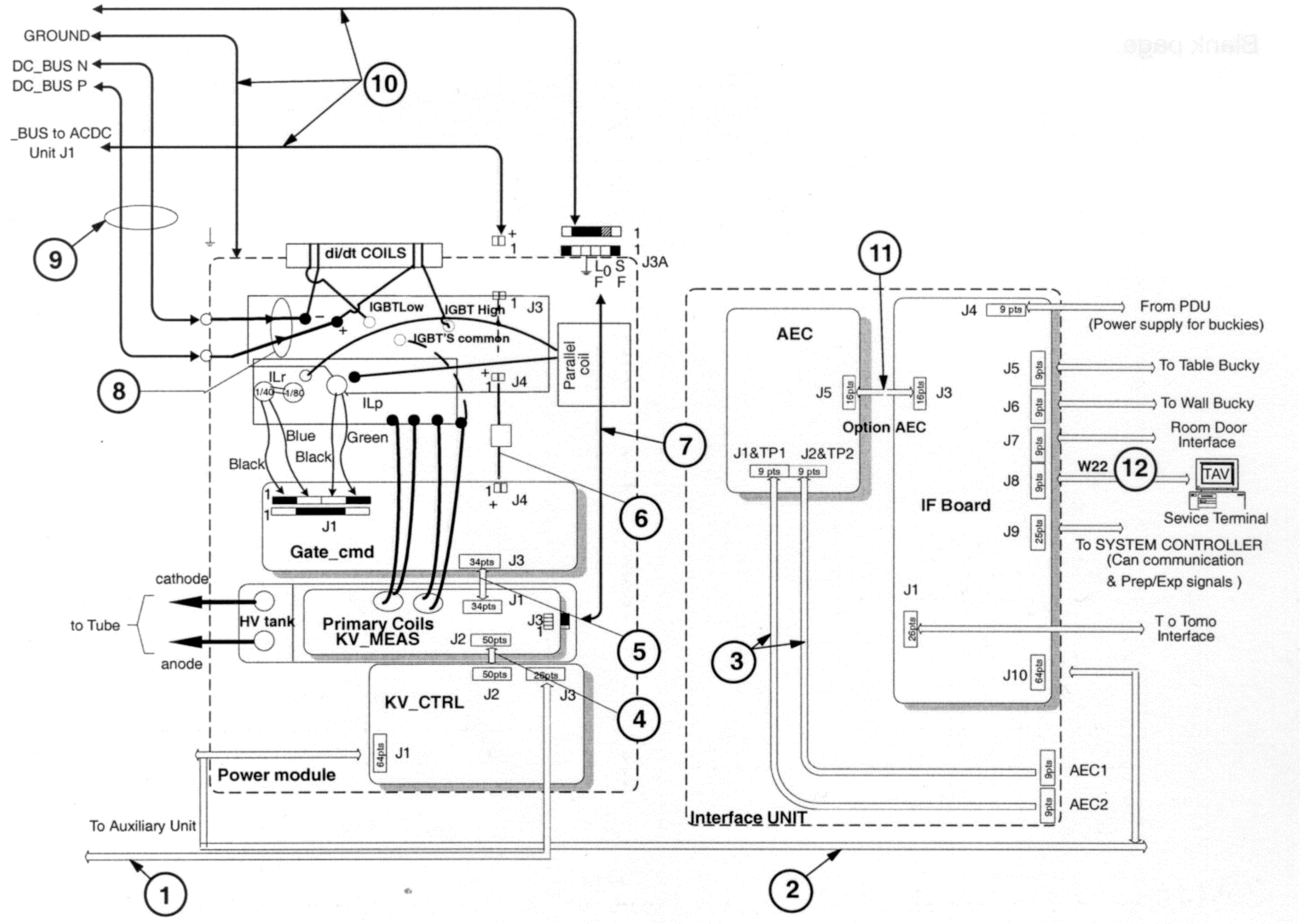
4 ROT/LVPS/Heater cable
2215903
FRU: 2

5 Inter Modules cable
2249998 for JEDI 50Plus R 1T 2244165
2249998-2 for JEDI 80R 1T 2268970
FRU: 2

AC-DC/Inverter DC bus cable
2249988
FRU: 2

Supply Y/EMC Board cable
2221733
FRU: 2

L VPS-Rotation strap
2215228
FRU: 2


GROUND
DC_BUS N
DC_BUS P
_BUS to ACDC
Unit J1
10
9
8
di/dt COILS
IGBTLow
IGBT High
IGBT'S common
J3
J3A
ILr
1/40
1/80
ILp
J4
Parallel coil
Blue
Black
Green
Black
7
6
J1
Gate_cmd
34pts
J3
cathode
to Tube
anode
HV tank
Primary Coils
KV_MEAS
J1
J2
50pts
5
4
KV_CTRL
25pts
J1
64pts
Power module
To Auxiliary Unit
1
2
3
11
AEC
J5
16pts
Option AEC
J1&TP1
J2&TP2
9 pts
IF Board
J4
From PDU
(Power supply for buckies)
J5
To Table Bucky
J6
To Wall Bucky
J7
Room Door Interface
J8
W22
12
TAV
Sevice Terminal
J9
To SYSTEM CONTROLLER
(Can communication
& Prep/Exp signals)
26pts
T o Tomo Interface
J10
AEC1
AEC2
Interface UNIT

1 CAN cable	**5** KV Measure – Gate Comd cable	9 AC/DC – bus cable
2249990	**2198185**	**2249988**
FRU: 2	FRU: 2	FRU: 2
2 KV Control – I/F RAD cable	**6** Quad Snub / Gate Comd cable	Inverter module cable
2202418	**2249993**	**2249998** for JEDI 50Plus R 1T 2244165
		2249998-2 for JEDI 80R 1T 2268970
FRU: 2	FRU: 2	FRU: 2
3 AEC cable Assy	**7** KV Meas. – Inv Filament cable	I/F – AEC cable (option)
2208000	**2249992**	**2202419**
FRU: 2	FRU: 2	FRU: 2
4 KV Meas. – KV Control cable	**8** Inverter DC bus cable	TAV cables
2250036	**2249994**	**2207478**
FRU: 2	FRU: 2	FRU: 2

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SECTION 3

JEDI GENERATOR DISASSEMBLY/REASSEMBLY

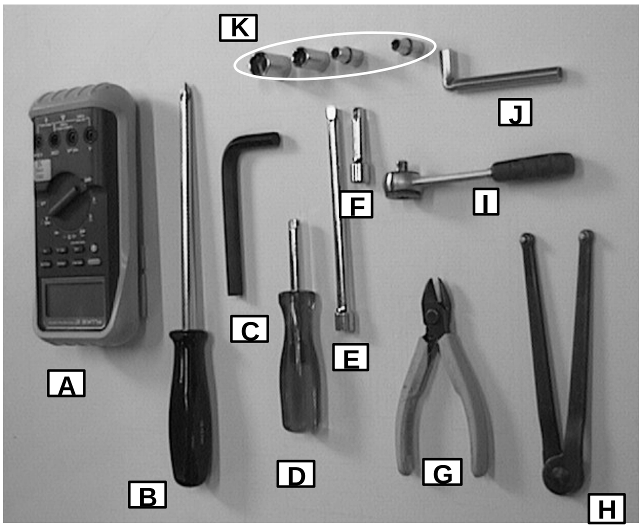
3-1 Introduction

This section provides information to dismount and remount FRU (Field Replaceable Unit).

3-2 TOOLS

Serviceability of Jedi Generator requires the following tools:

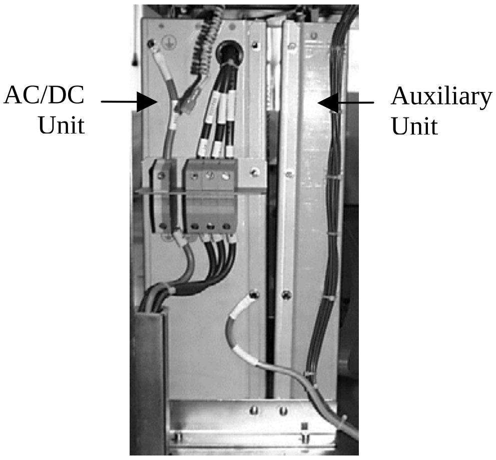
Digital multimeter	(A)
Philips screwdriver	(B)
Allen key	(C)
Screwdriver with interchangeable socket head	(D)
Long extension for ratchet wrench	(E)
Short extension for ratchet wrench	(F)
Cutting pliers	(G)
High Voltage wrench	(H)
Ratchet wrench	(I)
Socket wrench	(J)
Hexagonal head socket set	(K).

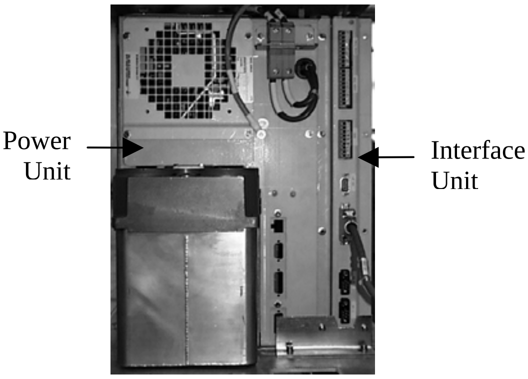


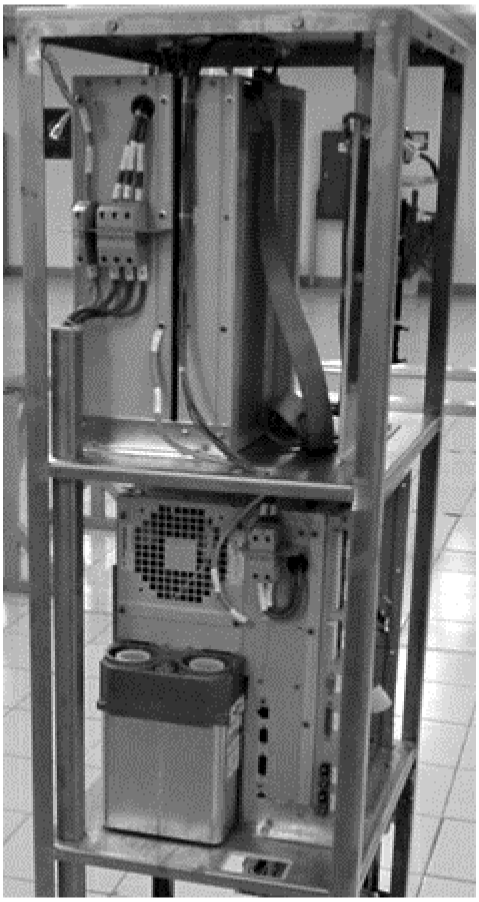
PROTEUS XR/a			**1/5**	**D/R JEDI 1**
subassembly: **JEDI Modules Disassembly/Reassembly**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:*	
	from / / *to / /*	*from* *to*	*Time:*	

1 INTRODUCTION

Jedi Generator are consist of four modules. Each module can be disassembled from the system.

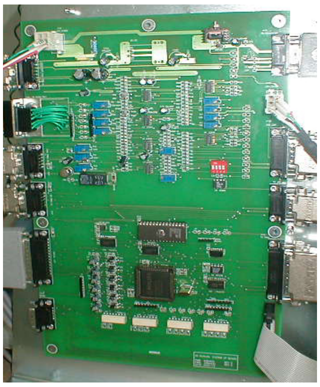

AC/DC Unit
Auxiliary Unit


Power Unit
Interface Unit

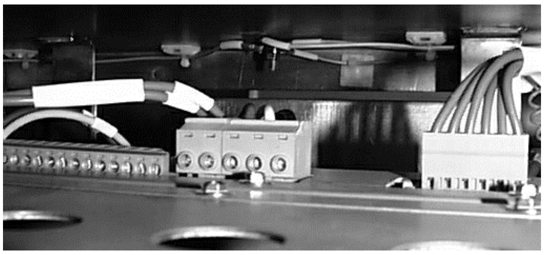


2 REMOVE THE AUXILIARY MODULE

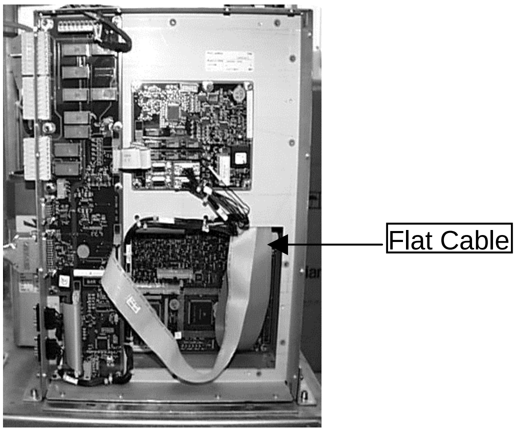
1. Disconnect all cables on the system interface board, then demount system interface board.



2. Disconnect the connectors and ground cables on top of the Auxiliary module.



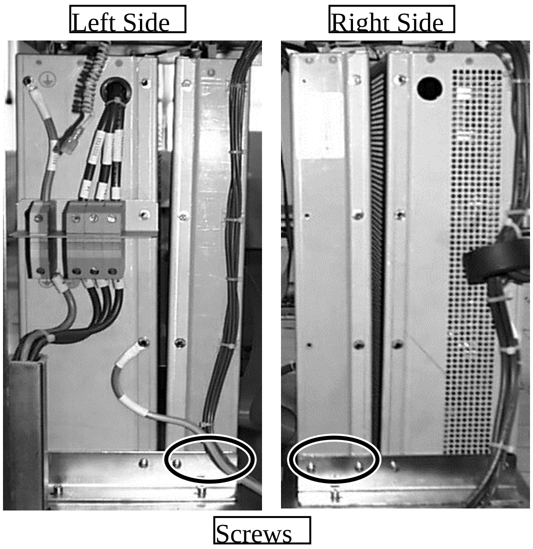
3. Disconnect the flat ribbon cable from Jedi kV Control Board.



4. Remove the three fastening screws on both side of the Interface Module.

5. Take out the Auxiliary module from the front side.

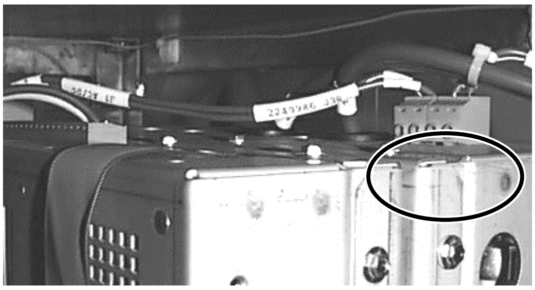
6. Reassemble the Auxiliary Module.



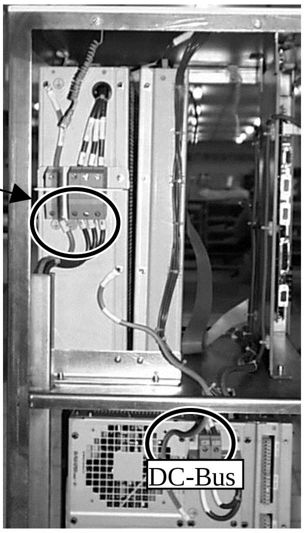
PROTEUS XR/a	3/5	D/R JEDI 1

3 REMOVE THE AC/DC MODULE

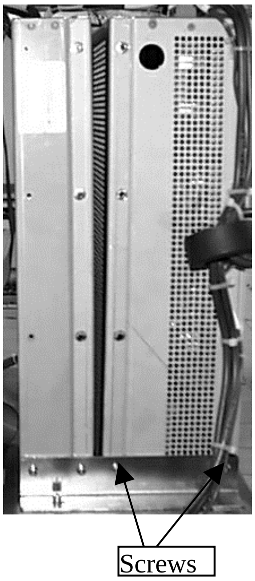
1. Remove the Auxiliary Module firstly.
2. Disconnect the connectors on top of the AC/DC module.



3. Disconnect the power cables and ground cables.
4. Disconnect the DC-Bus cable on Inverter Module.



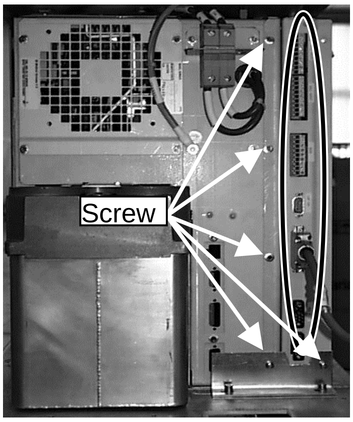
5. Remove the 4 fastening screws on both side of the AC/DC module.
6. Pull out the AC/DC.
7. Reassemble the Auxiliary and AC/DC Modules.



PROTEUS XR/a	4/5	D/R JEDI 1

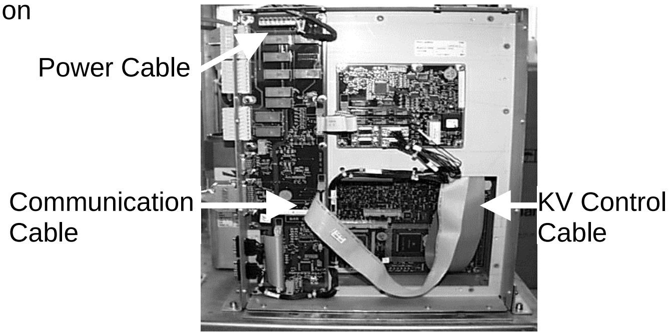
3 REMOVE THE INTERFACE MODULE

1. Disconnect the connectors on left side. (AEC, Bucky, Generator communication and Door light)
2. Remove the five screws from the left side of the Interface module.

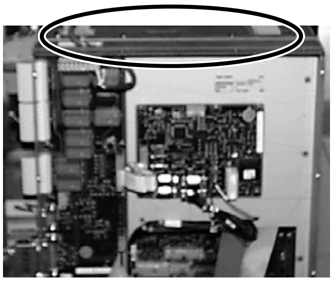


3. Disconnect the Power Cable and Communication Cable from Jedi Interface Board.

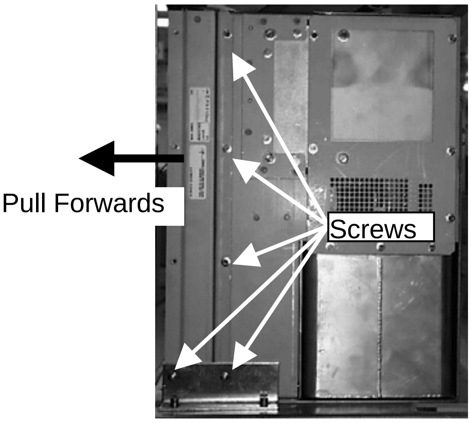
   Disconnect Jedi kV Control Board flat cable.


Power Cable
Communication Cable
KV Control Cable

4. Remove the four screws from the top of the Interface module.



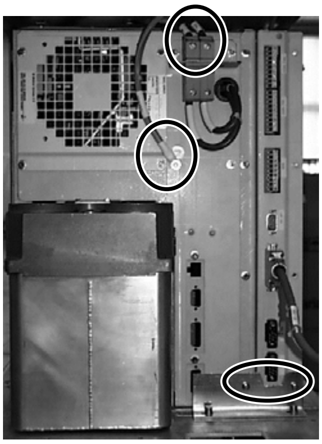
5. Remove the five screws from the right side of the Interface module.
6. Pull the Interface module forwards to take out the Interface module.
7. Reassemble the Interface Module.


Pull Forwards
Screws

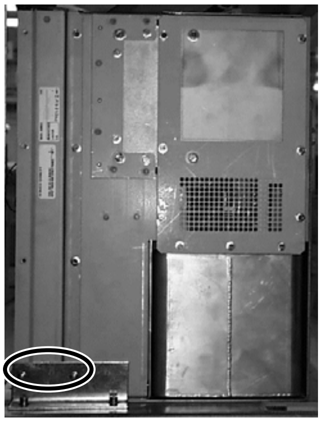
PROTEUS XR/a	5/5	D/R JEDI 1

4 REMOVE THE INVERTER MODULE

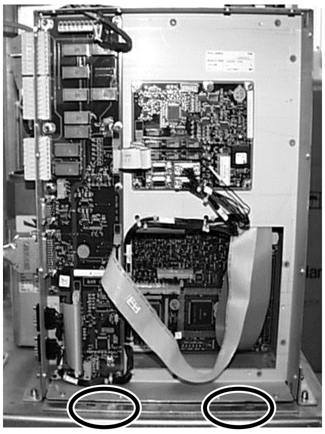
1. Disconnect all cables on the Interface module. (AEC, Bucky, Generator communication and Door light)
2. Disconnect DC power cable and ground cable on left side of the Inverter module.
3. Unplug the HV Cables from the socket.



4. Remove the two screws from the bracket.



5. Remove the two screws from the bracket.



6. Remove the two screws from the front side of main bracket.
7. Push Interface and Inverter modules forwards and take out the unit.
8. Demount the screws fastening Interface module with the Inverter module. (see 4/5)
9. Reassemble the Interface module and Inverter module.

PROTEUS XR/a			**1/8**	**D/R JEDI 17-37**
subassembly: **HV Tank or Inverter Power Supply**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***2h 00*min**	

1 SUPPLIES

None.

2 TOOLS

5.5 mm nut driver or socket wrench with ratchet.

3 mm Allen wrench.

13 mm socket with ratchet.

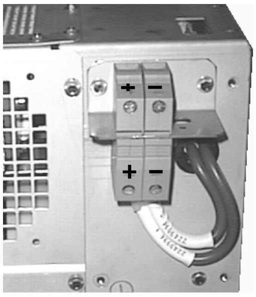
C–clamp for HV connections.

Multimeter.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

CAUTION **Check with the Multimeter in DC mode that the voltage is below 10 V between “+” and “-” terminals on the Power Unit (see below). IF NOT, WAIT UNTIL VOLTAGE BECOME O V BEFORE REMOVING CABLES.**



To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

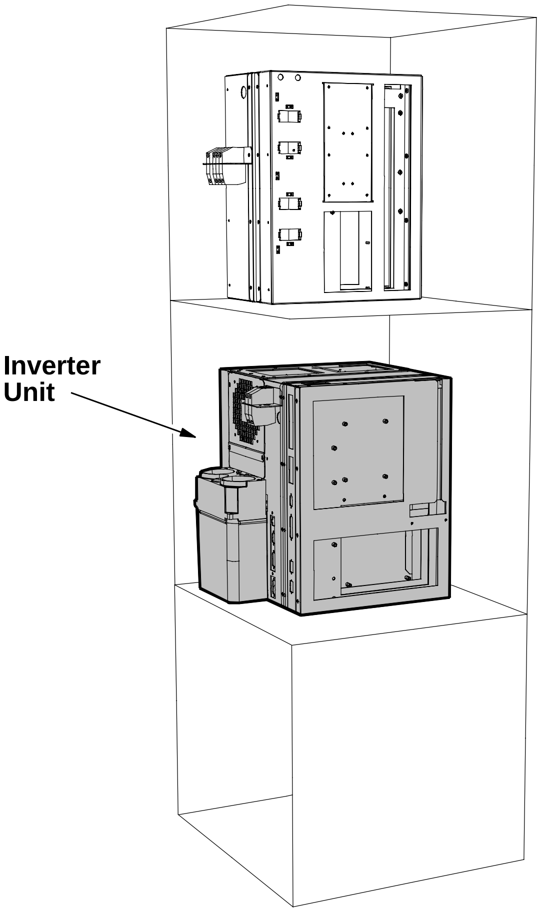
WARNING **THE WHOLE INVERTER UNIT WEIGHTS 30 KILOGRAMS (66 POUNDS). TWO PEOPLE ARE REQUIRED TO CARRY IT.**

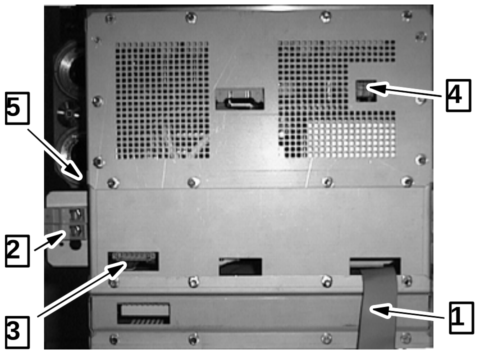
5 DISASSEMBLY

5-1 Remove the Inverter Unit

WARNING **THE POWER UNIT WEIGHTS 30 KILOGRAMS (66 POUNDS). DO NOT TRY TO LIFT IT WITHOUT ASSISTANCE**

1. Disconnect the HV cables, console, AEC and buckies cables.
2. Disconnect the flat wide ribbon cable $\boxed{1}$ from J1 on the Auxiliary Unit.
3. Disconnect “+” and “-” cables $\boxed{2}$.
4. Disconnect the cable from J3A $\boxed{3}$ and the cable from J3 QUAD SNUB $\boxed{4}$.
5. Unscrew the 5.5 mm screw holding the Ground cable $\boxed{5}$.
6. Remove the Inverter Unit from the cabinet.

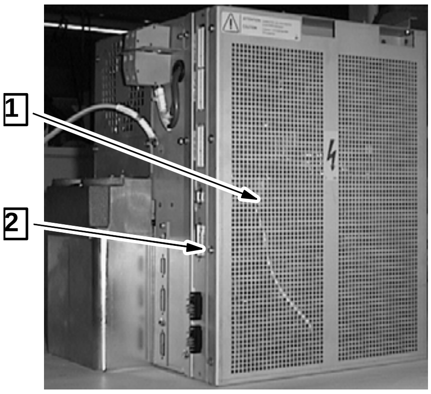




INVERTER UNIT TOP VIEW

5-2 Remove the Interface Unit box

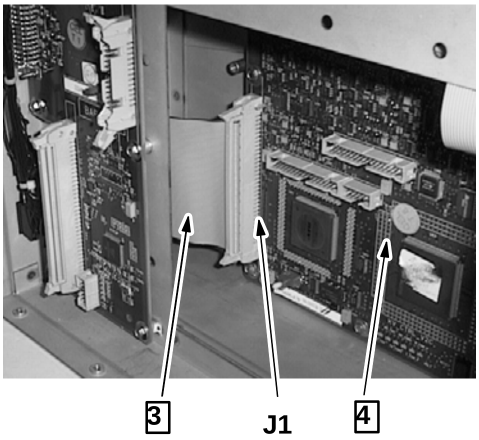
1. Unscrew twelve 5.5 mm screws that retain the cover panel and remove this one $\boxed{1}$.



2. Disconnect the flat wide ribbon cable $\boxed{3}$ from J1 of the KV Control Board $\boxed{4}$.

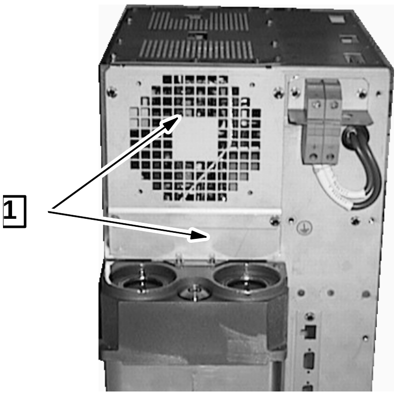
3. Unscrew twelve 5.5 mm screws $\boxed{2}$ securing the Interface Unit box to the Power box.

4. Remove the Interface Unit box.



5-3 Remove the HV tank or the Inverter Power Supply

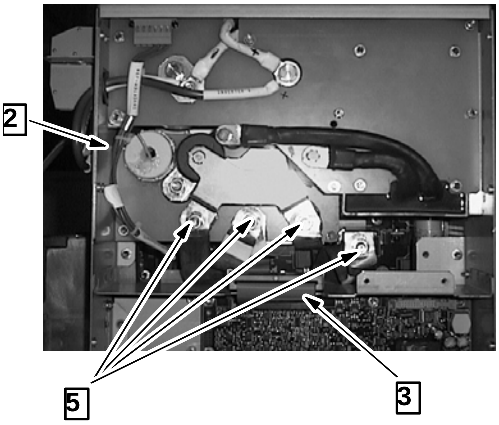
1. Unscrew the 5.5 mm screws securing the two EMC cover panels $\boxed{1}$ at the HV connections side and remove them.



NOTICE **Take great care not to let screws fall into the HV connector receptacles. Cover them with plastic caps.**

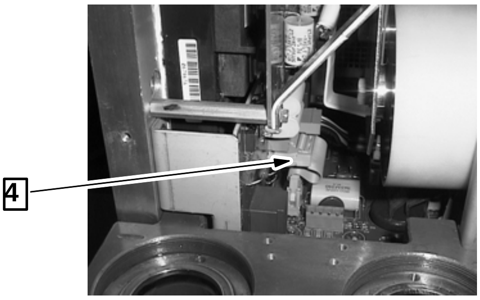
PROTEUS XR/a	4/8	D/R JEDI 17-37

2. Disconnect the cable $\boxed{2}$ connected to J3 on the KV Measure Board.



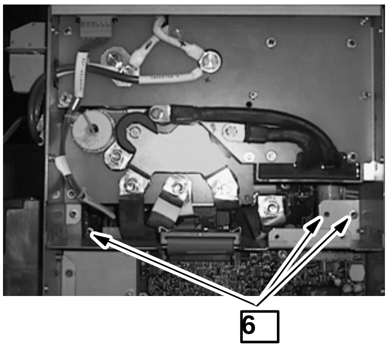
3. Disconnect the ribbon cable $\boxed{3}$ connecting J2 on the KV Control Board (Inverter Assembly) to J2 on the KV Measure Board (HV Tank).

4. Disconnect the ribbon cable $\boxed{4}$ connecting J3 on the Gate Command Board to J1 on the KV Measure Board (HV Tank).



5. Using a 13 mm socket wrench, remove the four nuts $\boxed{5}$ holding the Primary coil flat cables.

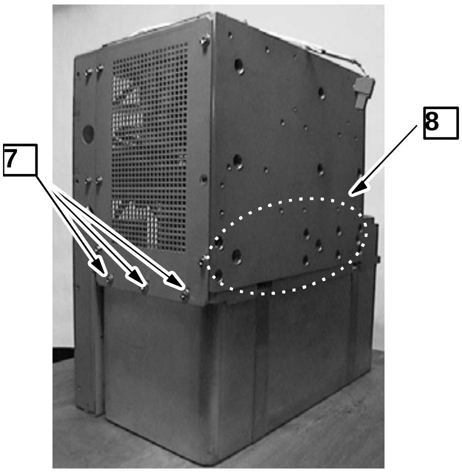
6. Disengage the end of Primaries coil flat cables from their screw and re-enter them towards the interior.



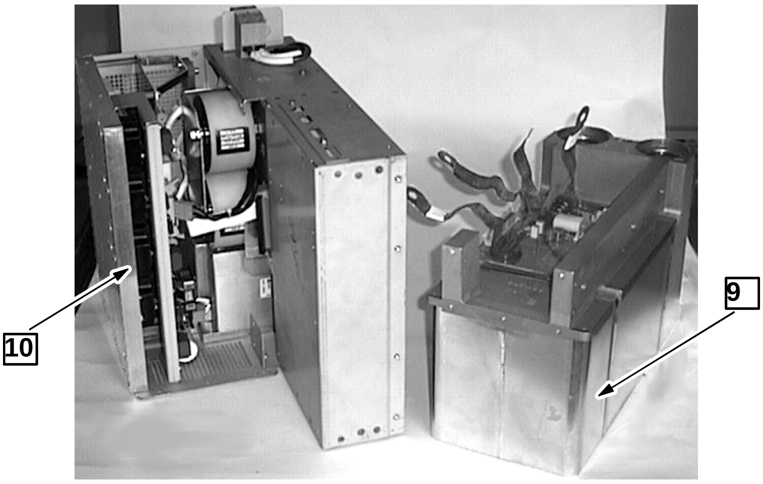
7. Remove the 5.5 mm screws: three at the front side $\boxed{6}$ (two at right, one at left) and three at the right side $\boxed{7}$.

8. At the rear side, remove the eight 3 mm Allen screws $\boxed{8}$ which secure the heat sink of the Inverter Power Assembly to the HV Tank.

9. Remove carefully upwards the Power Unit.



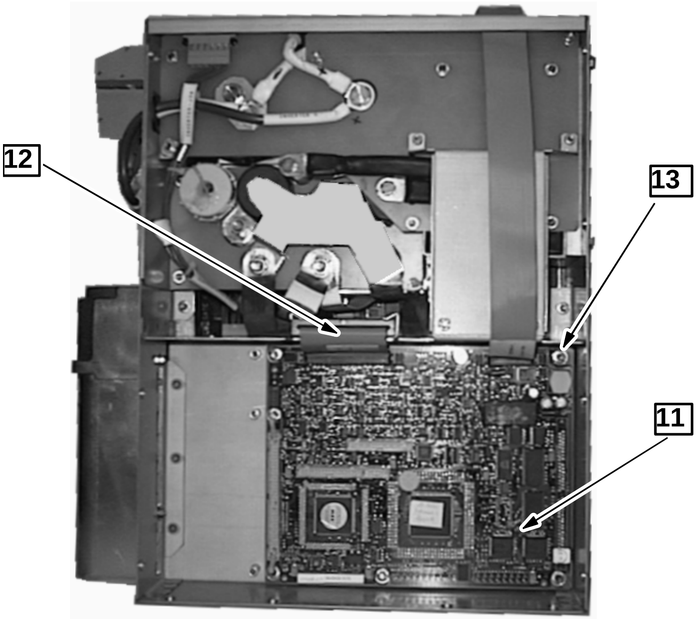
10. Take off the assembly constituted by: EMC covers, Coils Inverter Assy, Capa Inverter Assy, and KV Control Board. The HV Tank [9] and the Inverter Power Assembly [10] are now free .



NOTICE

In case of change the Inverter Power Assembly, you must recover the KV control Board [11] and mount it in the new Inverter Power Assembly.

- **Disconnect the Flat ribbon cable [12] J2.**
- **Remove the seven 5.5 mm screws [13] and recover the KV Control Board.**



6 REASSEMBLY

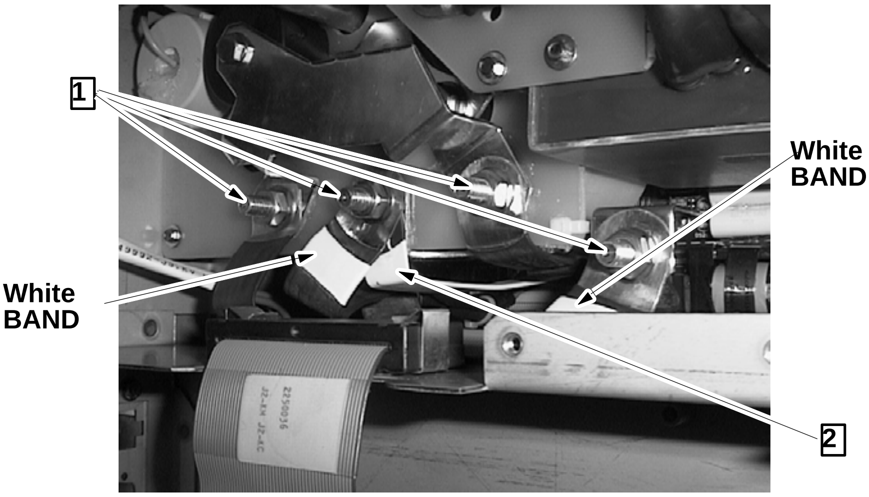
Reverse the disassembly procedure to reassemble and replace the unit.

1. Reassemble the HV Tank with the other elements of the Power Unit (refer to section 5–3 9, 10).
2. Mount the flat cable J1 on the KV Measure Board of the HV Tank (refer to section 5–3 4).
3. Mount the eight 3 mm Allen screws to secure the heat sink of the Inverter Power Assembly to the HV Tank. (refer to section 5–3 8).

   Tighten to torque 8 N.m (80 kg.cm).
4. Put back the 3 front 5.5 mm hex head screws (refer to section 5–3 6), one at the left side, two at the right side.

   Tighten to torque between 1.5 to 2 N.m (15 to 20 kg.cm).
5. Reconnect the ribbon cable from J1 on the KV Measure Board to J3 on the Gate Command Board (refer to section 5–3 4).
6. Using the 13 mm socket wrench, connect the primary coil flat cables to the four capacitors 1 .

CAUTION **Respect the position of the two flat cables with white bands on them (refer to illustration above).**
Make sure the presence of the IGBT Middle point 2 .



7. Reconnect the cable to J3 on the KV Measure Board (refer to section 5–3 $\boxed{2}$).

   Tighten the nuts to torque 8 N.m (80 kg.cm).

8. Reconnect the wider short ribbon cable from J2 on the KV Control Board to J2 on the kV Measure Board (refer to section 5–3 $\boxed{3}$).

9. Mount the 5.5 hex head screws securing the two EMC covers to the HV Tank on the HV outlet side (refer to section 5–3 $\boxed{1}$) and the three screws on the other side (refer to section 5–3 $\boxed{7}$).

   Tighten the screws to torque between 1.5 to 2 N.m (15 to 20 kg.cm).

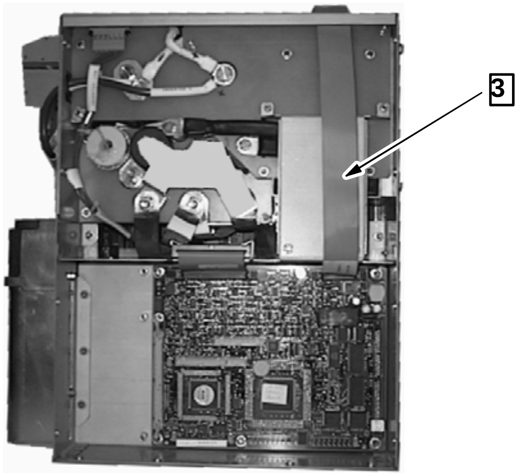
10. If Inverter Power Assembly has been changed, reverse the disassembly procedure to reinstall the KV Control Board (refer to section 5–3 $\boxed{11}$).

    Tighten 5.5 mm screws to torque between 1.5 to 2 N.m (15 to 20 kg.cm).

WARNING **THE POWER UNIT WEIGHTS 30 KG (66 POUNDS).**

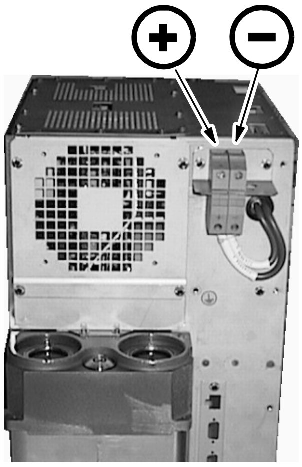
11. Remount the Interface Unit following the inverse procedure indicated in section 5–2.
12. Remount the Module in the Cabinet following the inverse procedure indicated in section 5–1.

NOTICE **Be sure to place the Flat ribbon cable $\boxed{3}$ J3 KV Control Board at the right position, see illustration below.**



PROTEUS XR/a	8/8	D/R JEDI 17-37

CAUTION **Be sure to place the “+” and “-” DC BUS in the right connector.**



13. Put 5 cl of oil into the HV receptacles. Reconnect Console, buckies and AEC cables.

7 VERIFY

Connect the service laptop (refer to page 4-26 ”Service Software User Guide” JOB CARD) and proceed to ”HV no load diagnostics” to ensure correct operation.
Skip steps ”Gate Command and Inverter in Short Circuit” diagnostics.

PROTEUS XR/a			**1/4**	**D/R JEDI 17-38**
subassembly: **Rotation Capacitors Set 23/56 (Rotation Capacitor Set 23/23 for MX100 X-ray tube)**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 15*****min**	

Note: When installing the system, do not use the capacitors in accessories crate #4 (refer to form "Crate dimensions & weight" on page 2-5 in Chapter 2) for installation. Pay attention to pick out and dispose the capacitors in accessories crate #4. Ensure the eco-friendly disposal of the capacitors.

1 SUPPLIES

None.

2 TOOLS

5.5 mm hex nut driver or socket wrench with ratchet.

Cutting pliers.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

The Rotation Capacitors are in the Jedi Generator Auxiliary Unit (10 kg).

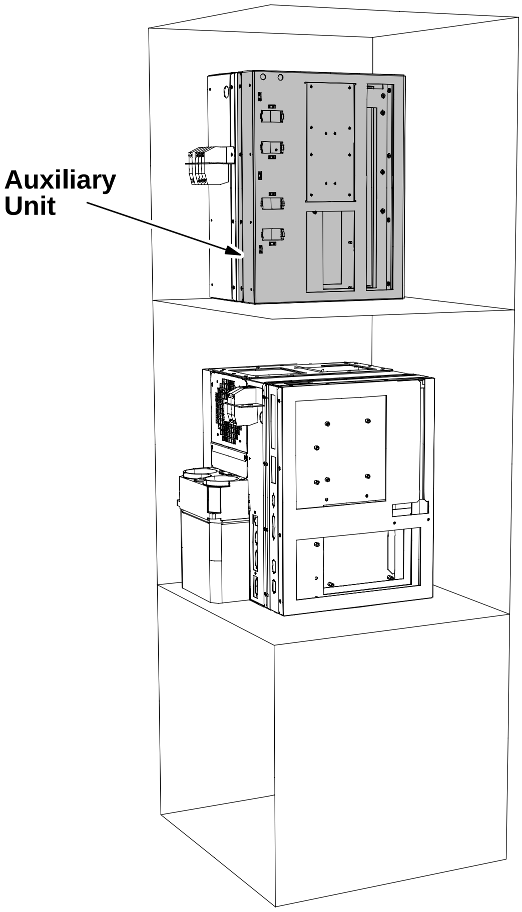
On the Auxiliary Unit, disconnect internal CAN cable, DC BUS, heater cable, and Tube cable.

5 PROCEDURE

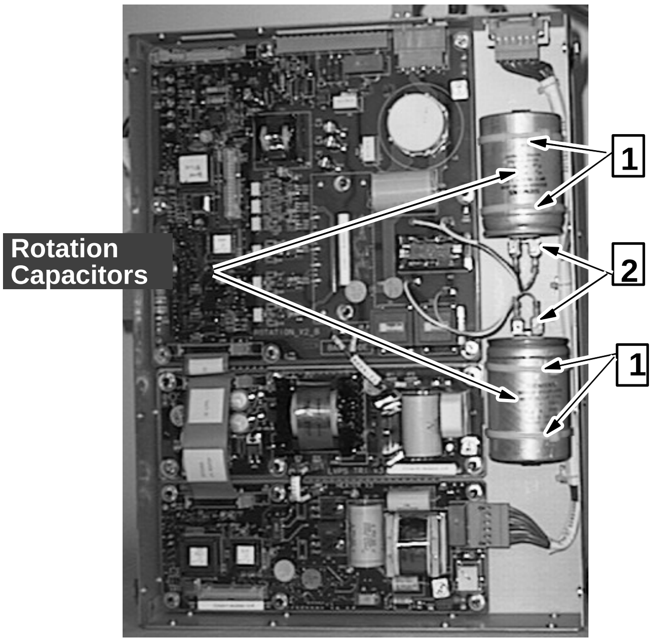
5-1 Remove the Auxiliary Unit Cover

NOTICE **The removing of the Rotation Capacitors can be done without removing the Auxiliary Unit from the Cabinet.**

Unscrew the sixteen 5.5 mm hex head screws and remove the cover on the Auxiliary Unit.



5-2 Remove the Rotation Capacitors



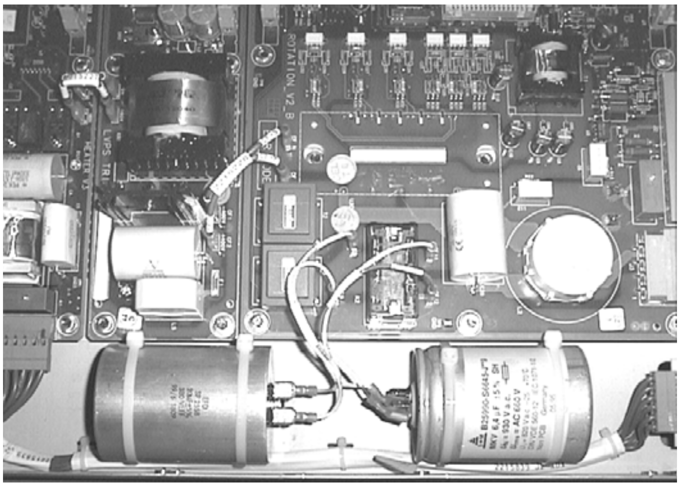
1. Cut the tie-wraps 1
2. Disconnect both capacitors 2
3. Remove the two Rotor Capacitors.

PROTEUS XR/a	3/4	D/R JEDI 17-38

6 REASSEMBLY

Reverse the disassembly procedures to reinstall the Rotor Capacitors.

Use the tie–wraps from the Accessory Spares Set to reattach the capacitors.



Ensure that the capacitors are correctly connected :

For Rad14,21 tube:

- connect the left capacitor **20** µ**F** to the board with cable 2259373 1

  connect the two cable terminals marked “C20 UF” to the below pins of the left capacitor **20** µ**F**

  connect the two cable terminals marked “CF 9” and “CF 10” to **CF9** and **CF10** on the board, respectively.

- connect the right capacitor **6.4** µ**F** to the board with cable 2259372 2

  connect the two cable terminals marked “C6.4 UF” to the upper pins of the right capacitor **6.4** µ**F**

  connect the two cable terminals marked “CF 11” and “CF 12” to **CF11** and **CF12** on the board, respectively.

For MX 100 tube:

- connect the left capacitor **12.6** µ**F** to the board with cable 2215658 1

  connect the two cable terminals marked “C12.6 UF” to the below pins of the left capacitor **12.6** µ**F**

  connect the two cable terminals marked “CF 9” and “CF 10” to **CF9** and **CF10** on the board, respectively.

- connect the right capacitor **10.5** µ**F** to the board with cable 2215659 2

  connect the two cable terminals marked “C10.5 UF” to the upper pins of the right capacitor **10.5** µ**F**

  connect the two cable terminals marked “CF 11” and “CF 12” to **CF11** and **CF12** on the board, respectively.

CAUTION **Pay attention to check the GPCP No. of the Rotation Capacitor Set and ensure its correct match with the different X-ray tube type.**

For Rad 14,21 X-ray tube, the GPCP No. should be 2250002.

For MX100 X-ray tube, the GPCP No. should be 2215674.

Replace the Rotation Capacitor Set when necessary.

7 VERIFY

Verify that the system functions correctly.

Remount the cover. Tighten the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

PROTEUS XR/a			**1/3**	**D/R JEDI 17-47**
subassembly: **I/F Board RAD**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 15*****min**	

1 SUPPLIES

None.

2 TOOLS

5.5 mm nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

To protect the circuit boards, do not forget to wear the antistatic bracelet.

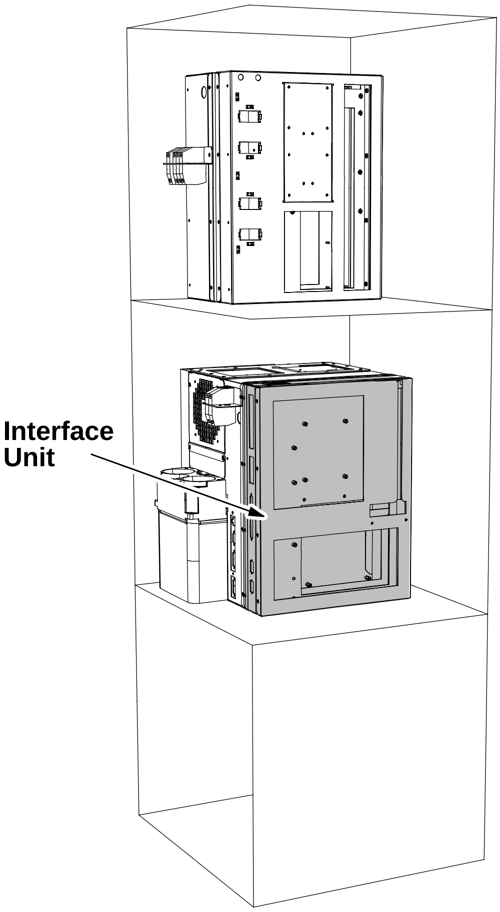
4 PREREQUISITES

WARNING **THE WHOLE INVERTER UNIT WEIGHTS 30 KILOGRAMS (66 POUNDS). TWO PEOPLE ARE REQUIRED TO CARRY IT.**

PROTEUS XR/a	2/3	D/R JEDI 17-47

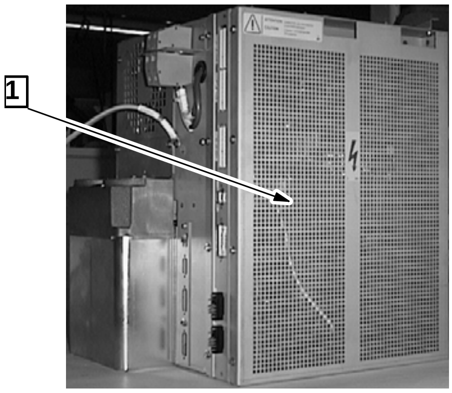
5 DISASSEMBLY

The I/F Board Rad is situated in the Interface Unit.



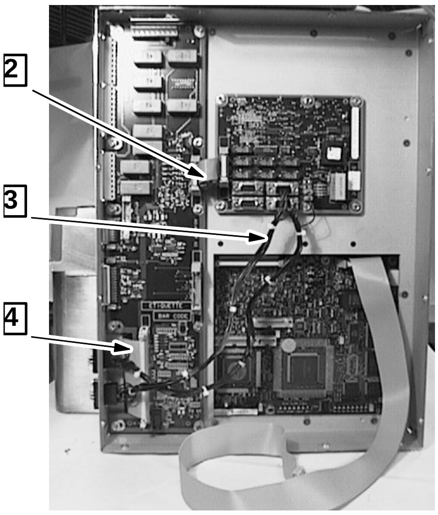
NOTICE **The removing of the I/F Board Rad can be done without removing the Interface Unit from the Cabinet.**

1. Unscrew twelve 5.5 mm screws that retain the cover panel and remove this one $\boxed{1}$.



2. Disconnect the flat ribbon cable $\boxed{2}$ and the two cables $\boxed{3}$, if existing, coming from the AEC Board (option).

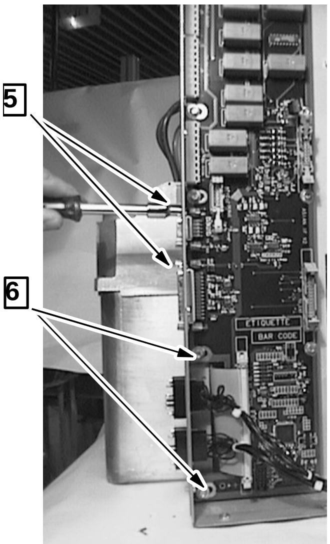
3. Disconnect the flat wide ribbon cable J10 coming from the KV Control Board $\boxed{4}$.



PROTEUS XR/a	3/3	D/R JEDI 17-47

4. Remove the four screws of connectors J8 and J9 $\boxed{5}$.

5. Remove the ten 5.5 mm screws $\boxed{6}$ securing the Interface Board Rad; remove the board.



6 REASSEMBLY

1. Reverse the disassembly procedure to reassemble the unit. Tighten screws to torque between 1.5 and 2 N.m (15 to 20 kg.cm).

2. Power the system on and verify that the system functions properly.

PROTEUS XR/a			**1/5**	**D/R JEDI 17-48**
subassembly: **KV Control Board**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to* / /	*from* *to*	*Time:* ***0h 45*****min**	

1 SUPPLIES

None.

2 TOOLS

5.5 mm nut driver or socket wrench with ratchet.

10 mm Allen wrench.

13 mm socket with ratchet.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

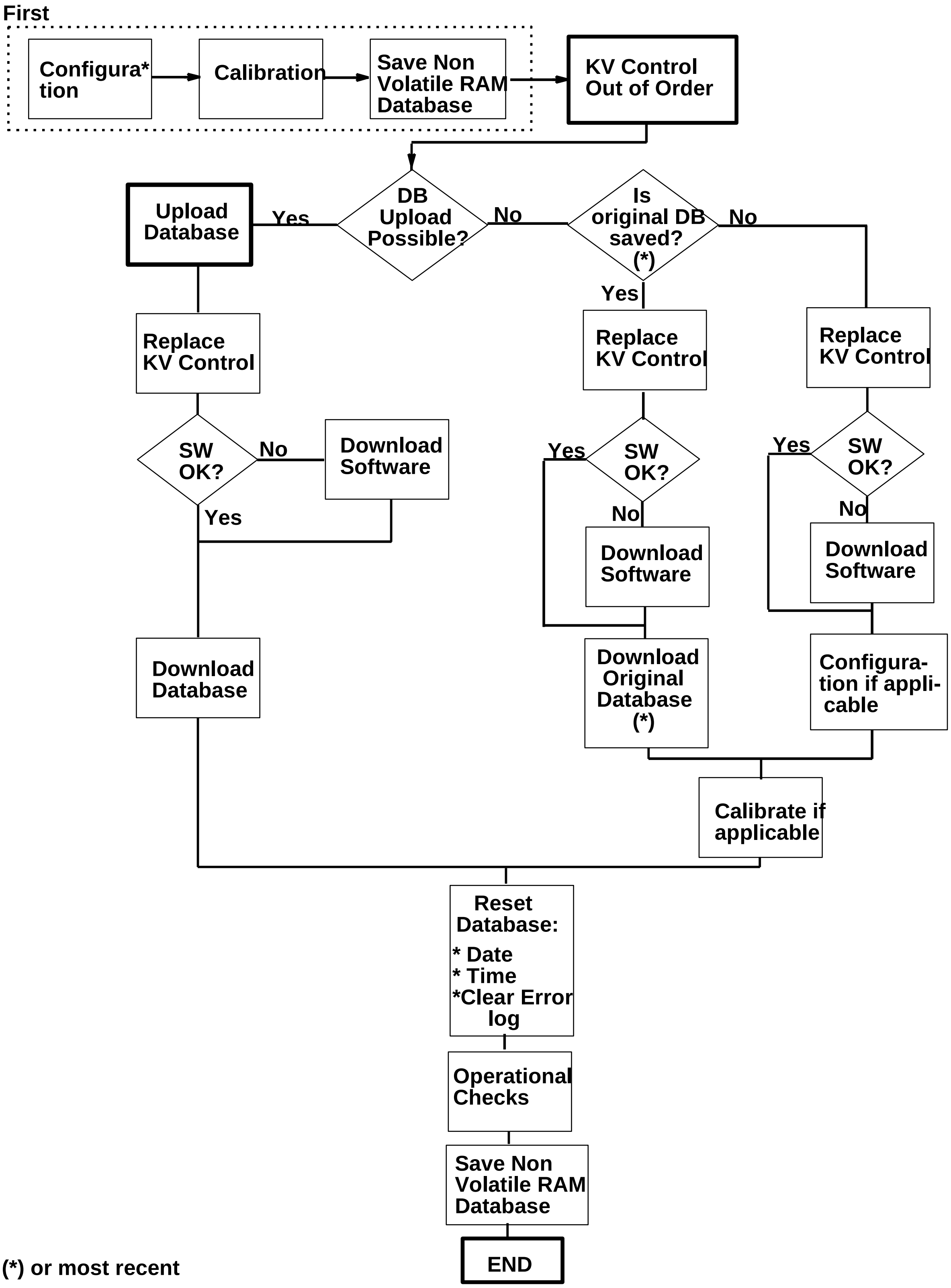
WARNING **THE WHOLE INVERTER UNIT WEIGHTS 30 KILOGRAMS (66 POUNDS). TWO PEOPLE ARE REQUIRED TO CARRY IT.**

The KV Control board contains a saved memory Database with essentially the following parameters:

- Tube configuration parameters, AEC calibration parameters, and Room configuration (workstation, AEC, screen film pairs).
- Filament aging variable
- Error Log
- Recorded parameter data

If it is possible, backup database first. Else, the diagram hereafter helps you to determine the action to take for your situation.

PROTEUS XR/a	2/5	D/R JEDI 17-48


First
Configura*tion
Calibration
Save Non Volatile RAM Database
KV Control Out of Order
DB Upload Possible?
Yes
No
Upload Database
Is original DB saved? (*)
No
Yes
Replace KV Control
Replace KV Control
Replace KV Control
SW OK?
No
Yes
Download Software
Yes
SW OK?
No
Download Software
Yes
SW OK?
No
Download Software
Download Database
Download Original Database (*)
Configura-tion if appli-cable
Calibrate if applicable
Reset Database:
* Date
* Time
*Clear Error log
Operational Checks
Save Non Volatile RAM Database
END

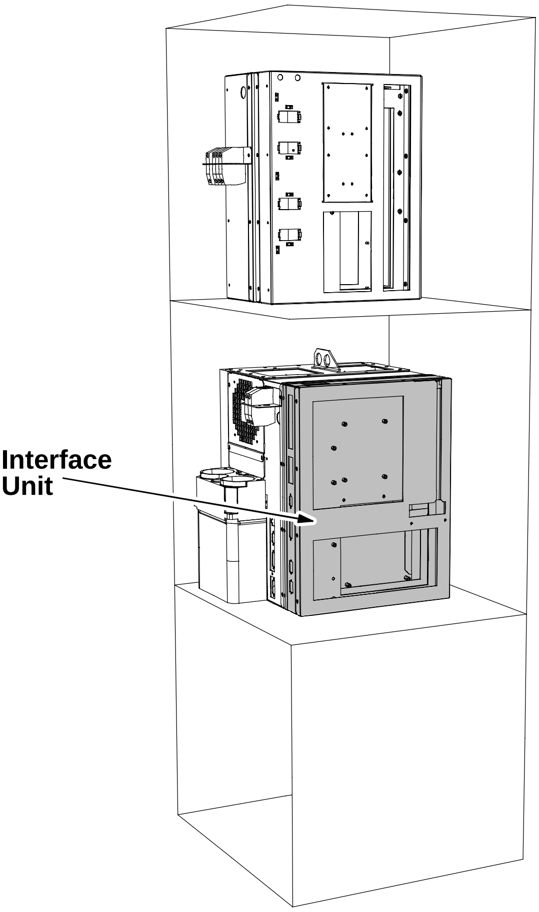
(*) or most recent

PROTEUS XR/a	3/5	D/R JEDI 17-48

5 DISASSEMBLY

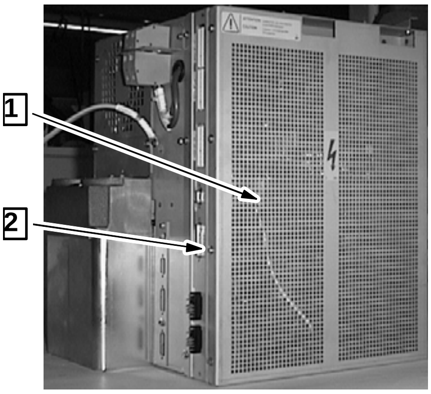
NOTICE **The KV Control Board spare is pre-loaded with NP/NP+ software. It will be required to download the software that is on site. DATABASE RESTORE IS MANDATORY.**

NOTICE **The installation of the KV Control Board can be done without removing the Inverter Unit from the Cabinet.**

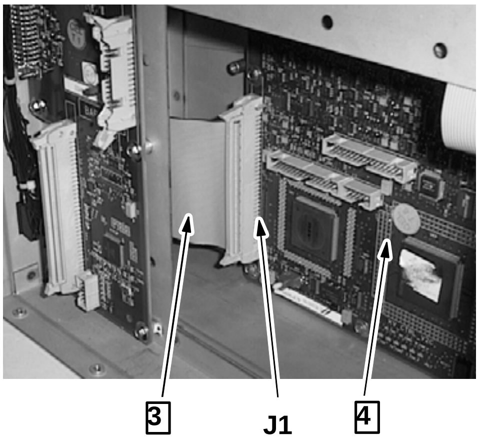


PROTEUS XR/a	**4/5**	**D/R JEDI 17-48**

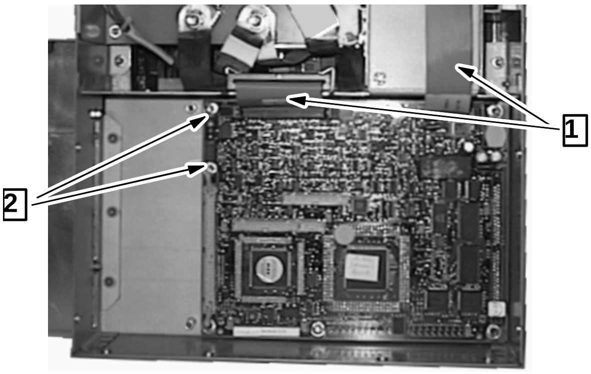
5-1 Remove the Interface Unit box



1. Unscrew twelve 5.5 mm screws that retain the cover panel and remove this one $\boxed{1}$.
2. Disconnect the flat wide ribbon cable $\boxed{3}$ from J1 of the KV Control Board $\boxed{4}$.
3. Unscrew twelve 5.5 mm screws $\boxed{2}$ securing the Interface Unit box to the Power box.
4. Remove the Interface Unit box.



5-2 Remove the kV Control Board



1. Disconnect the cables from J2 and J3 on the kV Control Board $\boxed{1}$.
2. Remove the seven 5.5 mm hex head screws $\boxed{2}$ which secure the kV Control Board; remove the board .

PROTEUS XR/a	5/5	D/R JEDI 17-48

6 REASSEMBLY

Reverse the disassembly procedure to reinstall the KV Control board and the Interface Unit.

Tighten 5.5 mm screws to torque between 1.5 and 2 N.m (15 to 20 kg.cm).

7 VERIFY

1. Connect the Service Laptop (refer to page 4-32 ”Service Software User Guide” JOB CARD)

2. Reapply power and verify that the 8 LEDs on KV Control board are scrolling.

3. Verify software version (service floppy, menu 5)
   - If it corresponds to the software version on the floppy delivered with the equipment (or upgraded by FMI), proceed to Database Restore (refer to page 4-86 ”Backup & Restore Database Setup Parameters” Calibration Job Card).
   - If not, download the software and proceed to ”Software Download / Upgrade” Job Card.

4. Restore Database (refer to page 4-86”Backup & Restore Database Setup Parameters” Calibration Job Card)
   - Up-to-date database if available
   - Most recent or originally saved Data Base if available
   - Default one from the floppy delivered with the equipment in the Service Tool set.

Alternately, you may try to swap the NVRAM chip (U32) from the former to the new KV Control board to keep all the parameters. Refer to page 8-18”Replace Non Volatile Parameters RAM” Job Card. If this chip is not involved in the failure or the cause for replacement, it will allow to keep up-to-date data.

5. Calibrate:
   - Perform several exposures on both focus in several workstation, with exposure time longer than 12.5 ms

   If default database was restored, it is necessary to resume room set up (refer to page 4-52”Workstation parameter” Calibration Job Card) and AEC calibration (if present) (refer to page 4-60” Automated AEC Calibration” Job Card”). Then perform the checksum (refer to page 4-83”Checksum Validation” Job Card).

6. Save Database on the service floppy delivered with the equipment (refer to page 4-80”Backup & Restore Database Setup Parameters” Job Card).

<table>
<tr><td colspan="3">PROTEUS XR/a</td><td>1/4</td><td>D/R JEDI 17-39</td></tr>
<tr><td colspan="5"><i>subassembly</i>: EMC Board 3 Phases</td></tr>
<tr><td colspan="3">purpose:</td><td colspan="2"><i>version no</i>. 0
<i>date:</i> 20/12/99</td></tr>
<tr><td><i>NF No.</i></td><td><i>Production date</i></td><td><i>Serial No.</i></td><td colspan="2"><i>Personnel:1</i></td></tr>
<tr><td></td><td><i>from / /</i>
<i>to / /</i></td><td><i>from</i>
<i>to</i></td><td colspan="2"><i>Time:</i> <i>0h 45</i>min</td></tr>
</table>

1 SUPPLIES

None.

2 TOOLS

5.5 mm nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

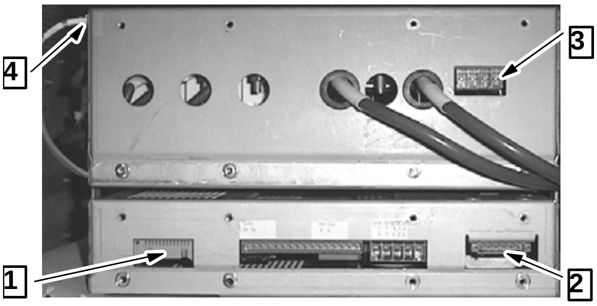
None.

PROTEUS XR/a	2/4	D/R JEDI 17-39

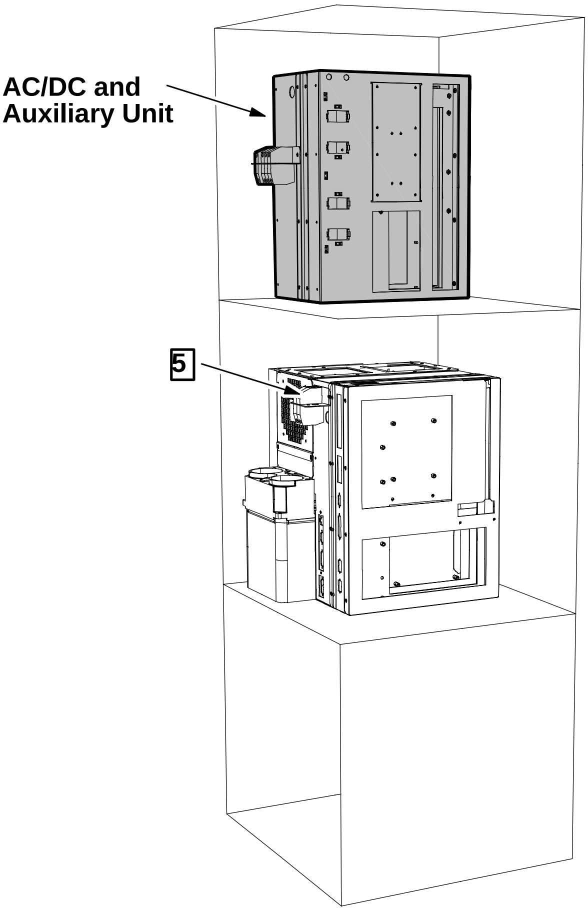
5 DISASSEMBLY

5-1 Remove AC/DC and Auxiliary Units Assy

1. Disconnect the flat wide ribbon cable $\boxed{1}$ from J1 on the Auxiliary Unit.
2. Disconnect the cable $\boxed{2}$ from J2 AUX.
3. Disconnect the cable $\boxed{3}$ from J2 AC/DC.
4. Disconnect “+” and “-” cables from the Inverter Unit $\boxed{5}$.
5. Unscrew the 5.5 mm screw holding the Ground cable $\boxed{4}$.
6. Remove the AC/DC and Auxiliary Units assembly from the Cabinet.

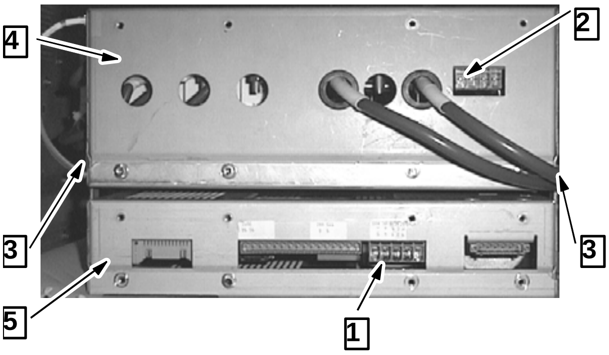


AC/DC and Auxiliary Units
ASSY
TOP VIEW



5-2 Remove the AC/DC Unit

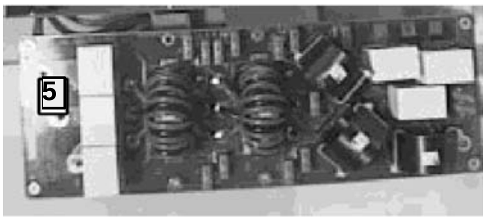
1. On the top of the AC/DC Unit, disconnect the cable from J3R $\boxed{1}$ and J1 AC/DC $\boxed{2}$.
2. Remove two 5.5 mm hex head screws at the right side and two at the left side $\boxed{3}$. The **AC/DC Unit** $\boxed{4}$ and the **Auxiliary Unit** $\boxed{5}$ are now **free.**

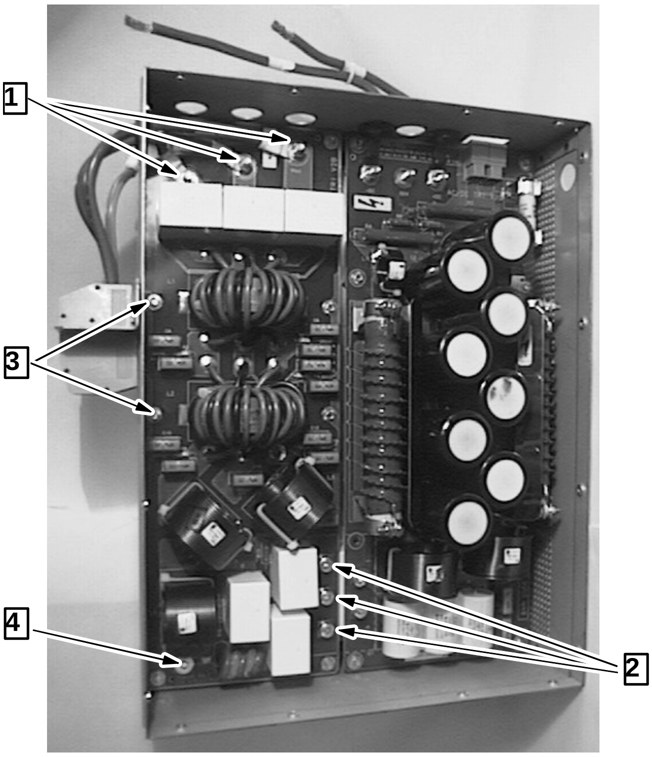


AC/DC and Auxiliary Units
ASSY
TOP VIEW

5-3 Remove the EMC Board on AC/DC Unit

1. Remove twelve 5.5 mm hex head screws which retain the cover. Remove that one.
2. Remove the three nuts $\boxed{1}$ securing the phase cables and three screws $\boxed{2}$ retaining the EMC board to the rectifier block.
3. Unscrew nine 5.5 mm hex head screws $\boxed{3}$, Standoff $\boxed{4}$ and remove the **EMC Board** $\boxed{5}$.





PROTEUS XR/a	4/4	D/R JEDI 17-39

6 REASSEMBLY

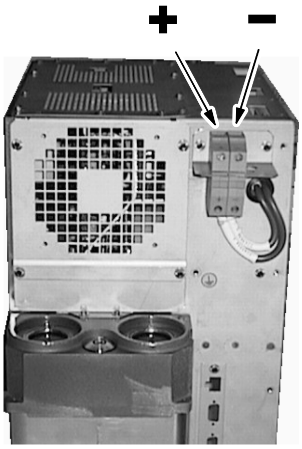
Reverse the disassembly procedure to reinstall the EMC board.

Tighten 5.5 mm screws to torque between 1.5 and 2 N.m (15 to 20 kg.cm).

CAUTION **Ensure that U1 Standoff is tighten to the torque between 1.5 and 2 N.m (15 to 20 kg.cm). Refer to section 5–3 $\boxed{4}$.**

Remount the AC/DC and Auxiliary Units Assembly inside the Cabinet.

CAUTION **Be sure to place the “+” and “-” DC BUS in the right connector.**



7 VERIFY

Reapply power and verify the presence of 3 phases.
Verify that the system functions correctly.

PROTEUS XR/a			**1/4**	**D/R JEDI 17-40**
subassembly: **AC/DC 3 PH Power Assembly**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 45*****min**	

1 SUPPLIES

None.

2 TOOLS

5.5 mm socket, with ratchet if possible (to remove cover and board)

10 mm socket with ratchet (to remove DC and rectifier cables)

Large Philips screw driver (to remove cables from the rectifier block).

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

1. Insure that the neon (orange) indicator light on the board has gone out.
2. Be careful touching components on this board; some become very hot.
3. To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

None.

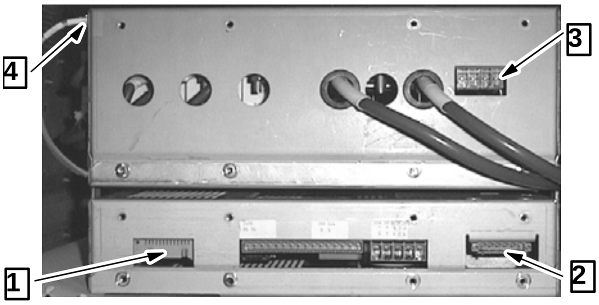
PROTEUS XR/a	**2/4**	**D/R JEDI 17-40**

5 DISASSEMBLY

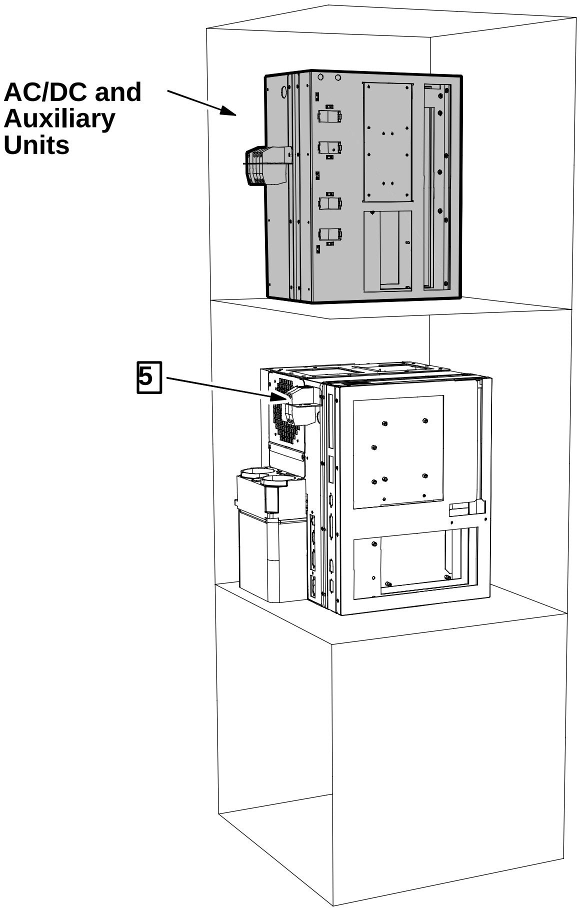
Note: ***The AC/DC 3 Phases Power Assembly is made up of two main elements: AC/DC BOARD 3 Phases and RECTIFIER BLOCK 3 Phases.***

5-1 Remove AC/DC and Auxiliary Units Assy

1. Disconnect the flat wide ribbon cable 1 from J1 on the Auxiliary Unit.
2. Disconnect the cable 2 from J2 AUX.
3. Disconnect the cable 3 from J2 AC/DC.
4. Disconnect “+” and “-” cables from the Inverter Unit 5.
5. Unscrew the 5.5 mm screw holding the Ground cable 4.
6. Remove the AC/DC and Auxiliary Units assembly from the Cabinet.



AC/DC and Auxiliary Units
ASSY
TOP VIEW

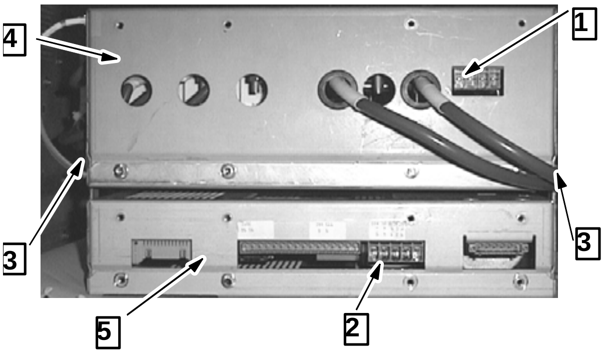


PROTEUS XR/a	**3/4**	**D/R JEDI 17-40**

5-2 Remove the AC/DC Unit

1. On the top of the AC/DC Unit, disconnect the cable from J3R $\boxed{1}$ and J1 AC/DC $\boxed{2}$.

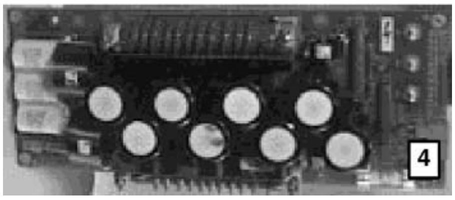
2. Remove two 5.5 mm hex head screws at the right side and two at the left side $\boxed{3}$. The **AC/DC Unit** $\boxed{4}$ and the **Auxiliary Unit** $\boxed{5}$ are now **free.**

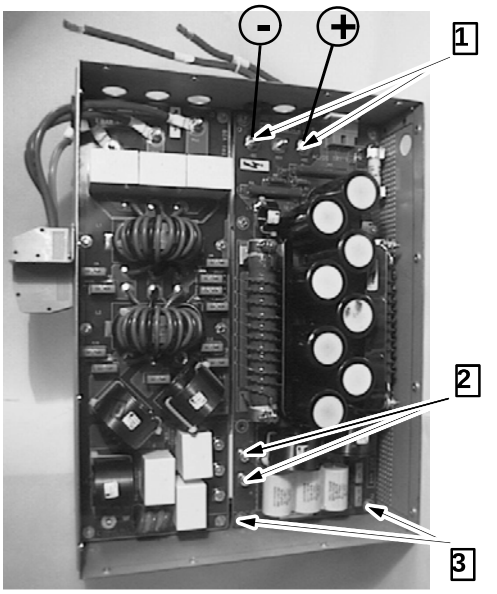


**AC/DC and Auxiliary Units
ASSY
TOP VIEW**

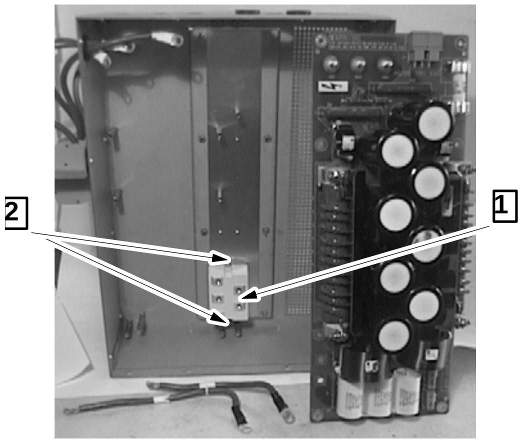
5-3 Remove the AC/DC Board on AC/DC Unit

1. Remove twelve 5.5 mm hex head screws which retain the cover. Remove that one.
2. Remove the two DC cables fastened with 10 mm nuts on the board $\boxed{1}$.
3. Remove two screws retaining the AC/DC board to the rectifier block $\boxed{2}$.
4. Remove seven 5.5 mm hex head screws $\boxed{3}$ and lift out the **AC/DC Board** $\boxed{4}$.





5-4 Remove the Rectifier Block



1. The Rectifier Block $\boxed{1}$ appears after removing the EMC Board (refer to ”EMC Board 3 Phases” Disassembly/Reassembly Job Card sections 5–3-2 to 5–3-3) and the AC/DC Board
1. With the Allen key 3 mm, unscrew the 2 screws $\boxed{2}$ holding the rectifier to the chassis and remove the block.

6 REASSEMBLY

1. Reverse the disassembly procedure to reinstall the AC/DC 3 PH Mid Power Assembly and the EMC Board.
2. Tighten the 10 mm cable retaining nuts to 3 N.m (30 kg.cm), and the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

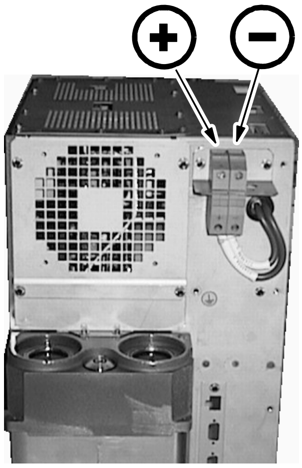
CAUTION **Ensure cables terminals are repositioned as noticed before.**

CAUTION **Verify that the + and - DC Bus cables are not reversed to prevent damage to the Inverter (Refer to section 5–3 $\boxed{1}$).**

CAUTION **The Rectifier Block has to be placed with the two poles in regard of the AC/DC Board (Refer to section 5–4 $\boxed{1}$).**

CAUTION **Be careful to preserve the special grease that is spread between the Rectifier Block and the chassis. This grease, called: Conductive Surface Compound, provides both thermal and electrical conductivity that is important in reducing failure of the rectifier.**

CAUTION **Be sure to place the “+” and “-” DC BUS in the right connector.**



3. Remount the AC/DC and Auxiliary Units Assy inside the Cabinet.

7 VERIFY

Reapply power and verify that the system functions correctly.

PROTEUS XR/a			**1/3**	**D/R JEDI 17-43**
subassembly: **:LV Power Supply 3 Phase Board**				
purpose:			*version no*. 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to / /*	*from* *to*	*Time:* ***0h 15*****min**	

1 SUPPLIES

None.

2 TOOLS

5.5 mm hex nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

DANGER

BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.

1. Insure that the Neon N1 (orange) indicator light on the LVPS Board has gone out.
2. Be careful touching components on the LVPS Board. Some become very hot.

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

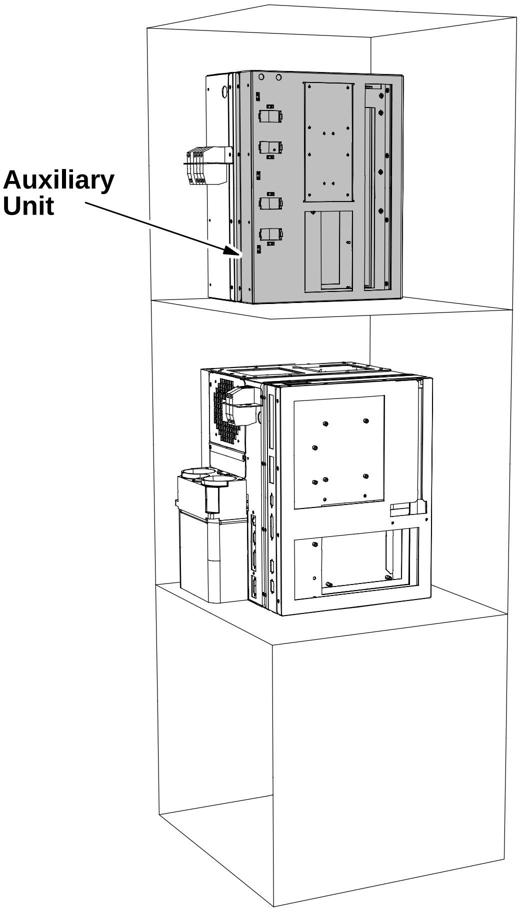
None.

PROTEUS XR/a	2/3	D/R JEDI 17-43

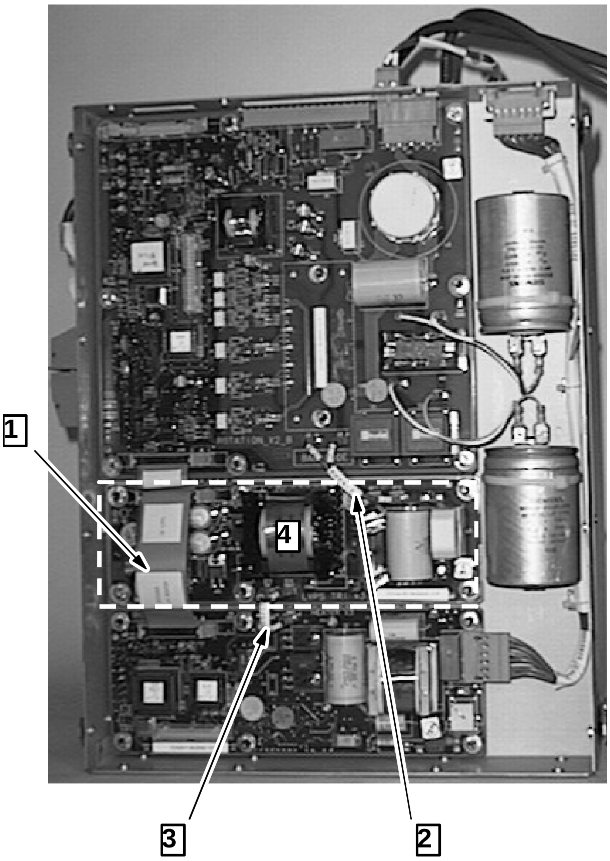
5 DISASSEMBLY

NOTICE **The removing of the LV Power Supply 3-Phase Board can be done without removing the Auxiliary Unit from the Cabinet.**

Unscrew the sixteen 5.5 mm hex head screws and remove the cover on the Auxiliary Unit.



5-1 Remove the LV Power Supply Board



1. Disconnect the 3 cables 1 , 2 , 3 from the LV Power Supply 3 Phases board 4 .
2. Unscrew the six 5.5 mm hex head screws and remove the **LV Power Supply 3 Phase Board** 4 .

6 REASSEMBLY

Reverse the disassembly procedures to reinstall the LV Power Supply 3 Phases Board.

CAUTION **Verify that the following cables are not reversed before power ON (refer to section 5–1):**

1. **Cables CF2 (+DC BUS) and CF1 (- DC BUS)** $\boxed{2}$**.**
2. **Cables CF4 (160 V) and CF3 (0 V)** $\boxed{3}$**.**

Tighten the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

Remount the cover. Tighten the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

7 VERIFY

Verify that the system functions correctly.

<table>
<tr><td colspan="3">PROTEUS XR/a</td><td>1/3</td><td>D/R JEDI 17-44</td></tr>
<tr><td colspan="5"><i>subassembly</i>: :Filament Board 1 INV</td></tr>
<tr><td colspan="3">purpose:</td><td colspan="2"><i>version no</i>. 0
<i>date:</i> 20/12/99</td></tr>
<tr><td><i>NF No.</i></td><td><i>Production date</i></td><td><i>Serial No.</i></td><td colspan="2"><i>Personnel:1</i></td></tr>
<tr><td></td><td><i>from</i> / /
<i>to</i> / /</td><td><i>from</i>
<i>to</i></td><td colspan="2"><i>Time:</i> <i>0h 15</i>min</td></tr>
</table>

1 SUPPLIES

None.

2 TOOLS

5.5 mm hex nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

1. Insure that the Neon DS3 (green) indicator light on the Filament Board has gone out.

2. Be careful touching components on the Filament Board . Some become very hot.

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

None.

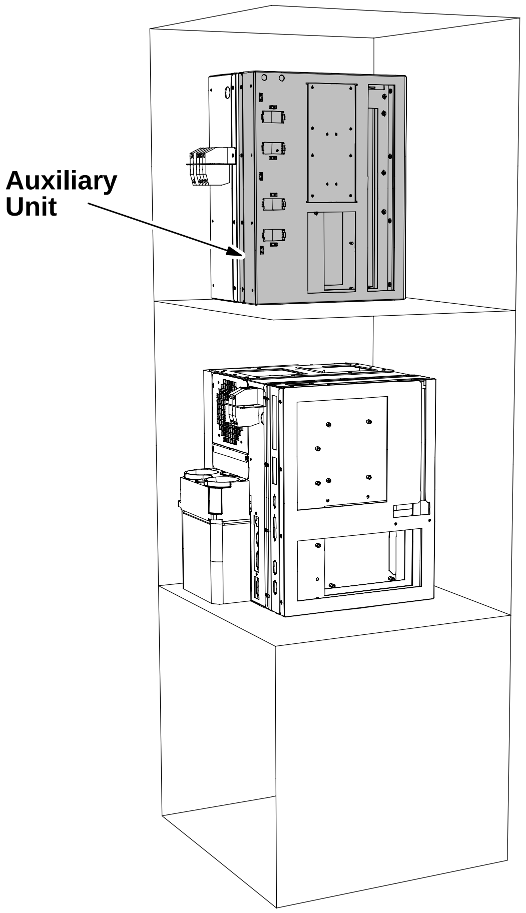
5 DISASSEMBLY

5-1 Remove LV Power Supply Cover

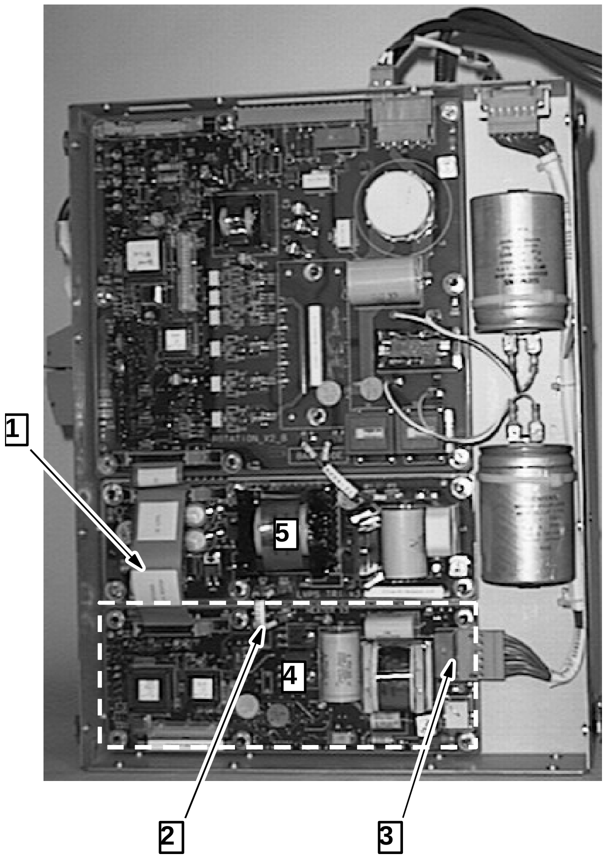
NOTICE

The removing of the Rotation Capacitors can be done without removing the Auxiliary Unit from the Cabinet.

Unscrew the sixteen 5.5 mm hex head screws and remove the cover on the Auxiliary Unit.



5-2 Remove the Filament Board



1. Disconnect the ribbon cable $\boxed{1}$ between the Filament Board $\boxed{4}$ and the LVPS Board $\boxed{5}$. Disconnect $\boxed{2}$ and the connector J2 $\boxed{3}$.
2. Unscrew the six 5.5 mm hex head screws and remove the **Filament Board 1 INV** $\boxed{4}$.

6 REASSEMBLY

Reverse the disassembly procedures to reinstall the Filament Board 1 INV.

CAUTION **Verify that cables CF4 (160 V) and CF3 (0 V)** $\boxed{2}$ **are not reversed before power ON (refer to section 5–2).**

Tighten the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

Remount the cover. Tighten the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

7 VERIFY

Verify that the system functions correctly.

Run Heater Function Diagnostics.

PROTEUS XR/a			**1/3**	**D/R JEDI 17-45**
subassembly: **:Rotor Board High Speed**				
purpose:			*version no.* 0 *date:* **20/12/99**	
NF No.	*Production date*	*Serial No.*	*Personnel:1*	
	from / / *to* / /	*from* *to*	*Time:* ***0h 15*****min**	

1 SUPPLIES

None.

2 TOOLS

5.5 mm hex nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

DANGER

BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.

1. Insure that the Neon DS7 (orange) indicator light on the Rotor Board has gone out.

2. Be careful touching components on the Rotor Board. Some become very hot.

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

None.

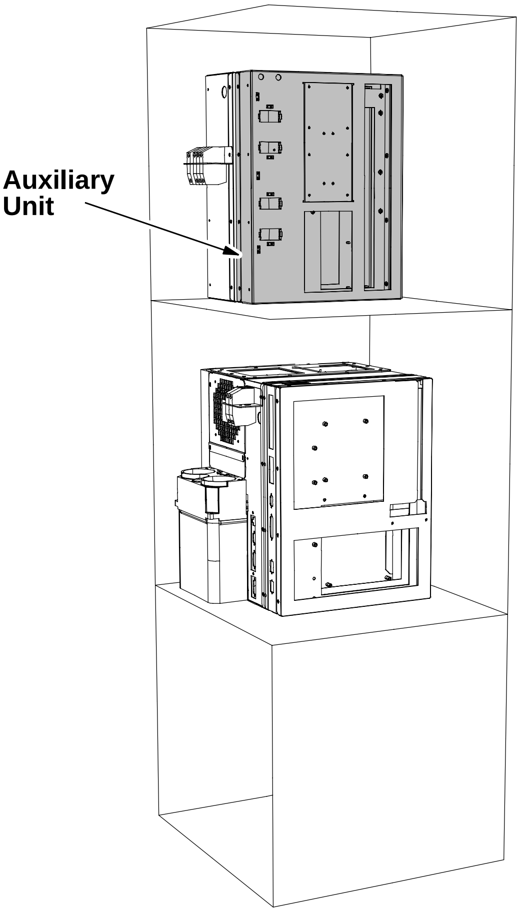
5 DISASSEMBLY

5-1 Remove Auxiliary Unit Cover

NOTICE

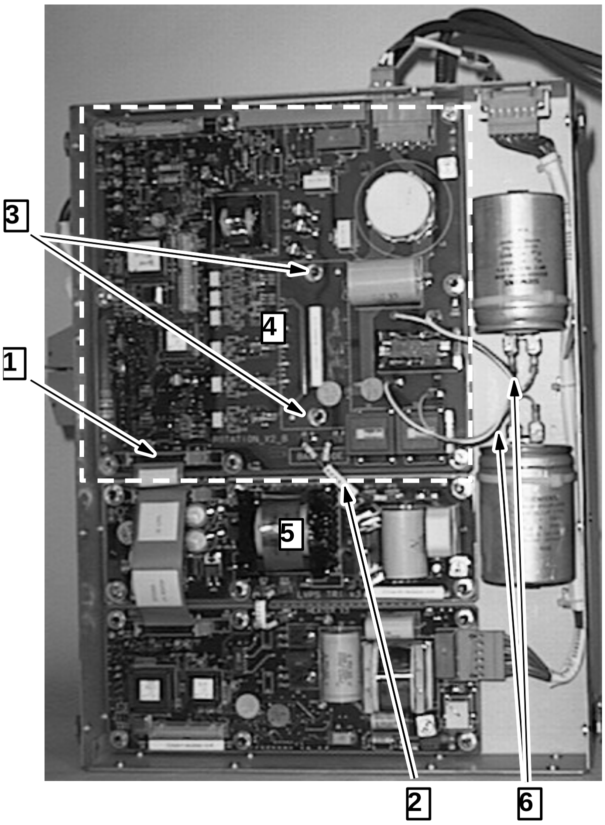
The removing of the Rotation Capacitors can be done without removing the Auxiliary Unit from the Cabinet.

Unscrew the sixteen 5.5 mm hex head screws and remove the cover on the Auxiliary Unit.



5-2 Remove the Rotor Board

1. The Auxiliary Unit being free, unscrew ten 5.5 hex head screws and remove its cover.
2. Disconnect the ribbon cable $\boxed{1}$ between the Rotor Board High Speed $\boxed{4}$ and the LVPS Board $\boxed{5}$. Disconnect cables CF1 and CF2 $\boxed{2}$.
3. Disconnect Capacitor cables CF9, CF10, CF11, CF12 $\boxed{6}$.
4. Unscrew two 5.5 mm hex head screws that are in holes $\boxed{3}$ below the surface of the board and that secure an IGBT.
5. Unscrew the eight 5.5 mm hex head screws and remove the **Rotor Board High Speed** $\boxed{4}$.



CAUTION **Be careful to preserve the special grease that is spread between the IGBT and a heat sink under the Rotation Board. This grease, called ”Conductive Surface Compound”, provides both thermal and electrical conductivity that are important in reducing failure of the IGBT.**

6 REASSEMBLY

Reverse the disassembly procedure to reinstall the Rotor Board High Speed.

Tighten the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

CAUTION **Ensure that cables are correctly connected. Ensure that marks on the cables match the marks on the board.**

Remount the cover. Tighten the 5.5 mm hex head screws to 1.5 to 2 N.m (15 to 20 kg.cm).

7 VERIFY

Verify that the system functions correctly.

Run Heater Function Diagnostics.

<table>
<tr><td colspan="3">PROTEUS XR/a</td><td>1/3</td><td>D/R JEDI 17-46</td></tr>
<tr><td colspan="5"><i>subassembly</i>: :AEC Board (Option)</td></tr>
<tr><td colspan="3">purpose:</td><td colspan="2"><i>version no</i>. 0
<i>date:</i> 20/12/99</td></tr>
<tr><td><i>NF No.</i></td><td><i>Production date</i></td><td><i>Serial No.</i></td><td colspan="2"><i>Personnel:1</i></td></tr>
<tr><td></td><td><i>from</i> / /
<i>to</i> / /</td><td><i>from</i>
<i>to</i></td><td colspan="2"><i>Time:</i> <i>0h 10</i>min</td></tr>
</table>

1 SUPPLIES

None.

2 TOOLS

5.5 mm nut driver or socket wrench with ratchet.

3 SAFETY PRECAUTIONS

DANGER **BEFORE ANY MANUAL INTERVENTION, ENSURE THE MAIN POWER IS OFF. APPLY LOCK OUT - TAG OUT PROCEDURE FOR YOUR OWN SAFETY WHEN MANIPULATING INSIDE THE EQUIPMENT IS REQUIRED.**

To protect the circuit boards, do not forget to wear the antistatic bracelet.

4 PREREQUISITES

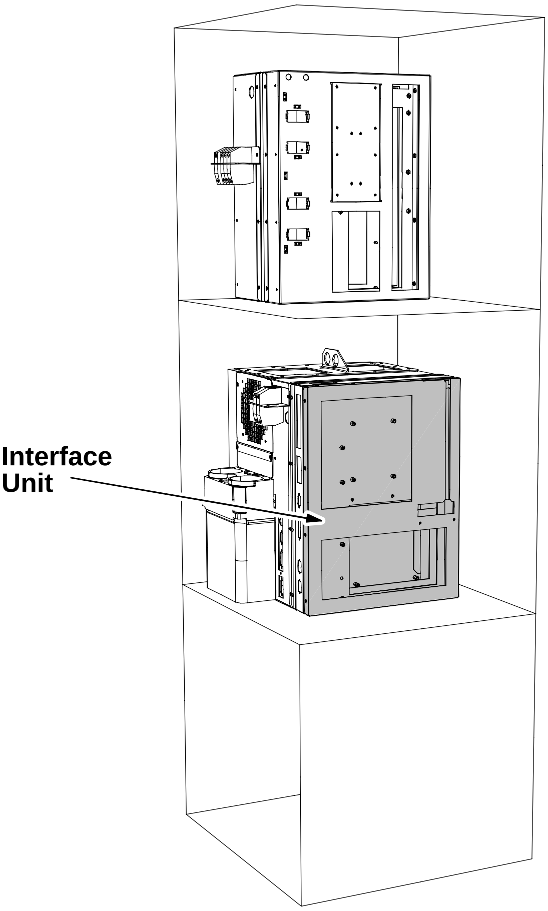
WARNING **THE WHOLE INVERTER UNIT WEIGHTS 30 KILOGRAMS (66 POUNDS). TWO PEOPLE ARE REQUIRED TO CARRY IT.**

PROTEUS XR/a	2/3	D/R JEDI 17-46

5 DISASSEMBLY

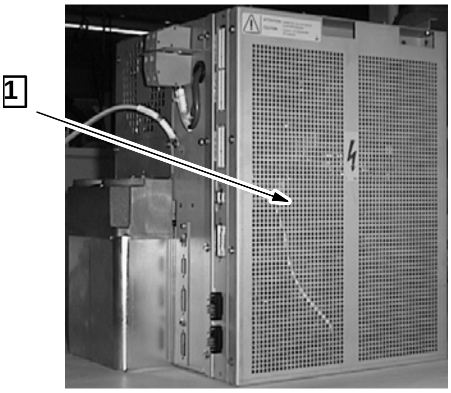
NOTICE

The installation of the AEC Board can be done without removing the Interface Unit from the Cabinet.



5-1 Remove the AEC Board

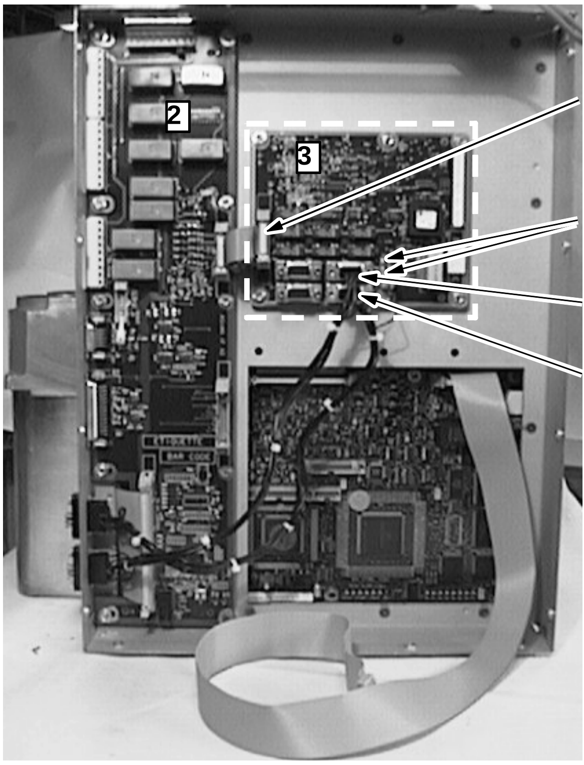
1. Unscrew twelve 5.5 mm screws that retain the cover panel and remove this one $\boxed{1}$.



2. Disconnect the flat ribbon cable from J5 $\boxed{4}$ between the I/F Board RAD $\boxed{2}$ and the AEC Board $\boxed{3}$.

3. Disconnect the connectors J2 $\boxed{6}$ and J1 $\boxed{7}$, and Test Points TP1 and TP2 $\boxed{5}$ on the AEC Board.

4. Remove the six 5.5 mm screws securing the **AEC Board** $\boxed{3}$.



6 REASSEMBLY

Reverse the disassembly procedure. Tighten screws to torque between 1.5 and 2 N.m (15 to 20 kg.cm).

7 VERIFY

Reapply power.
Proceed to ”AEC diagnostics” to ensure correct operation.

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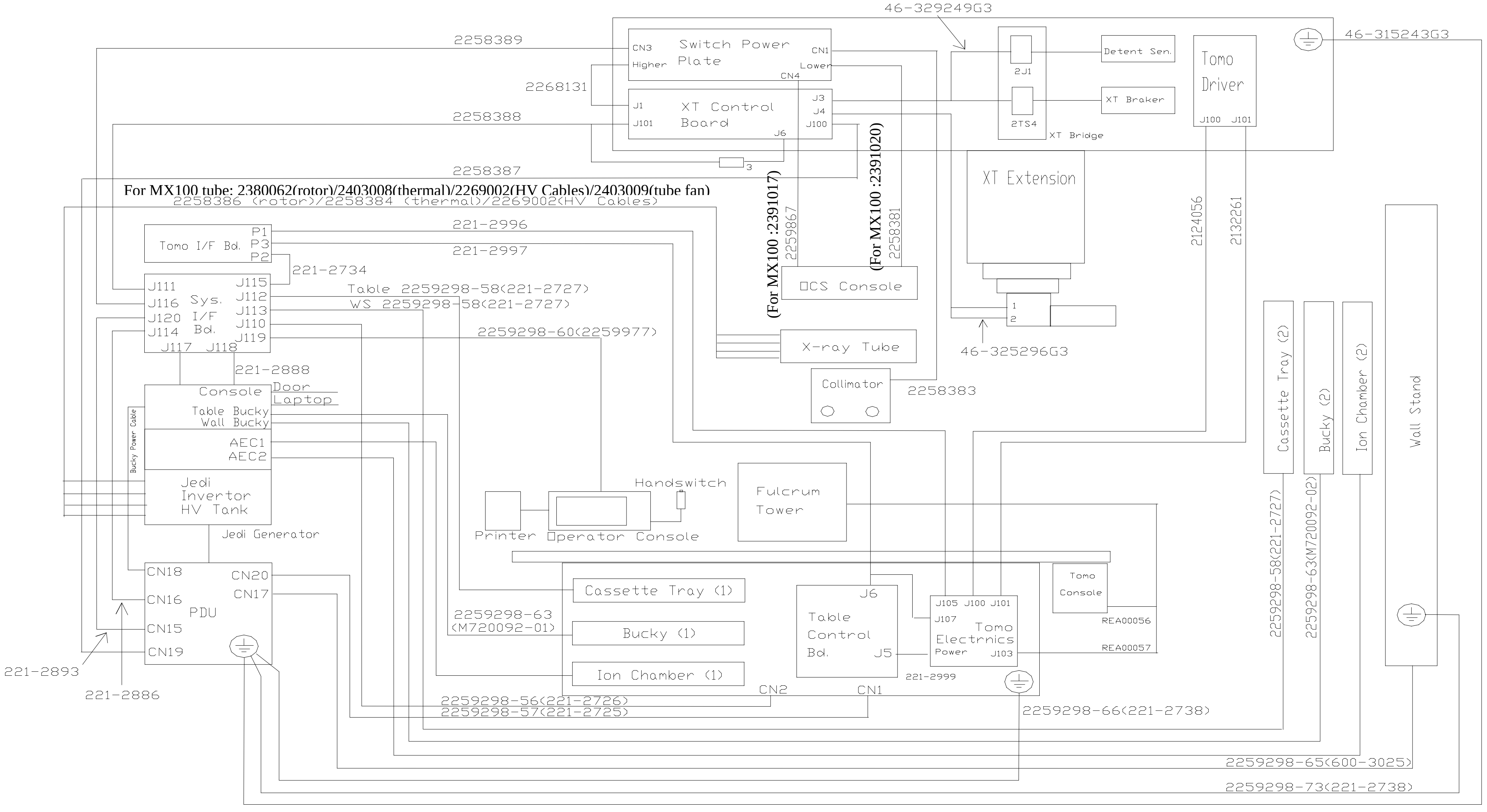
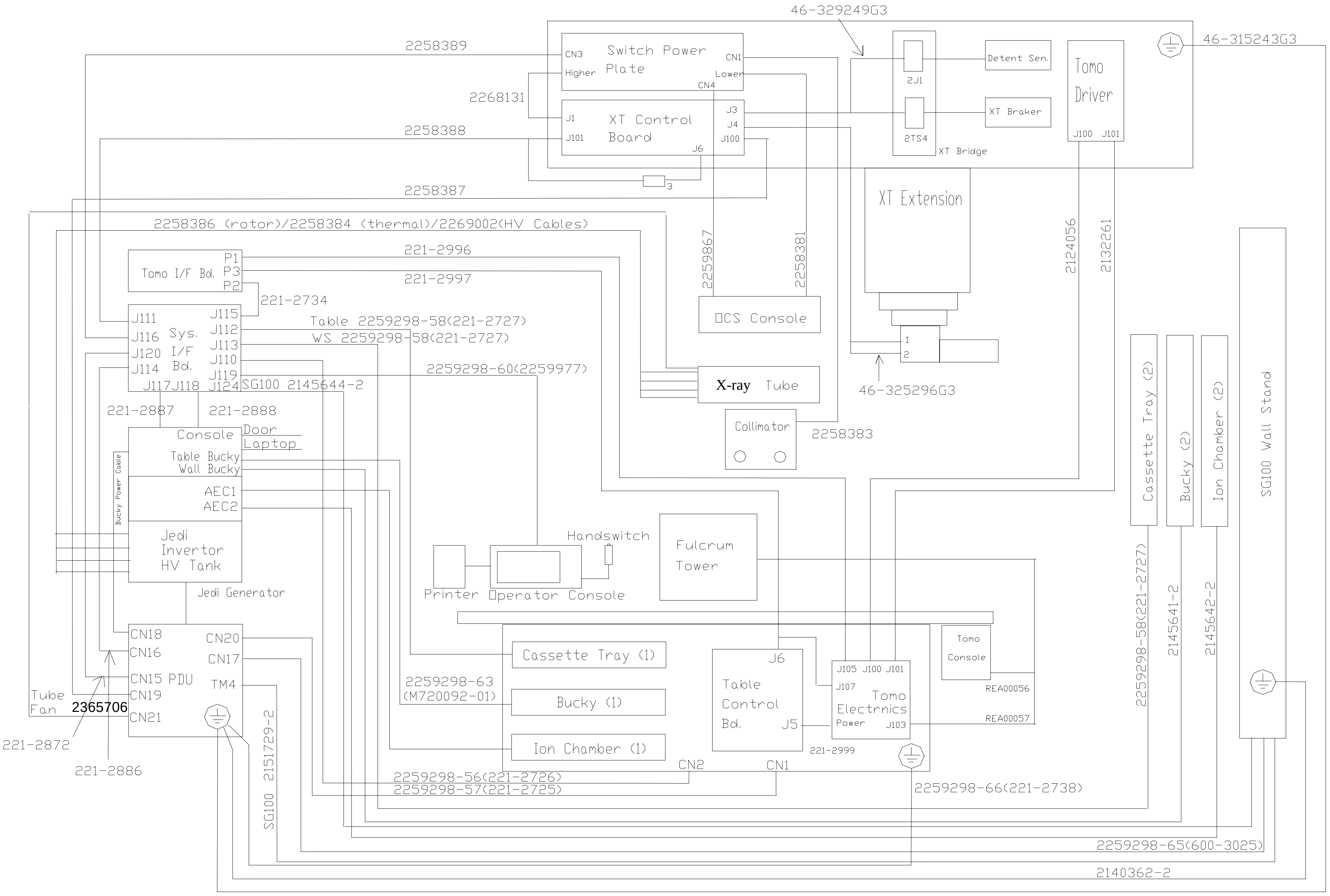
CHAPTER 10 SCHEMATICS

SECTION 1 PROTEUS XR/a SYSTEM MIS MAP

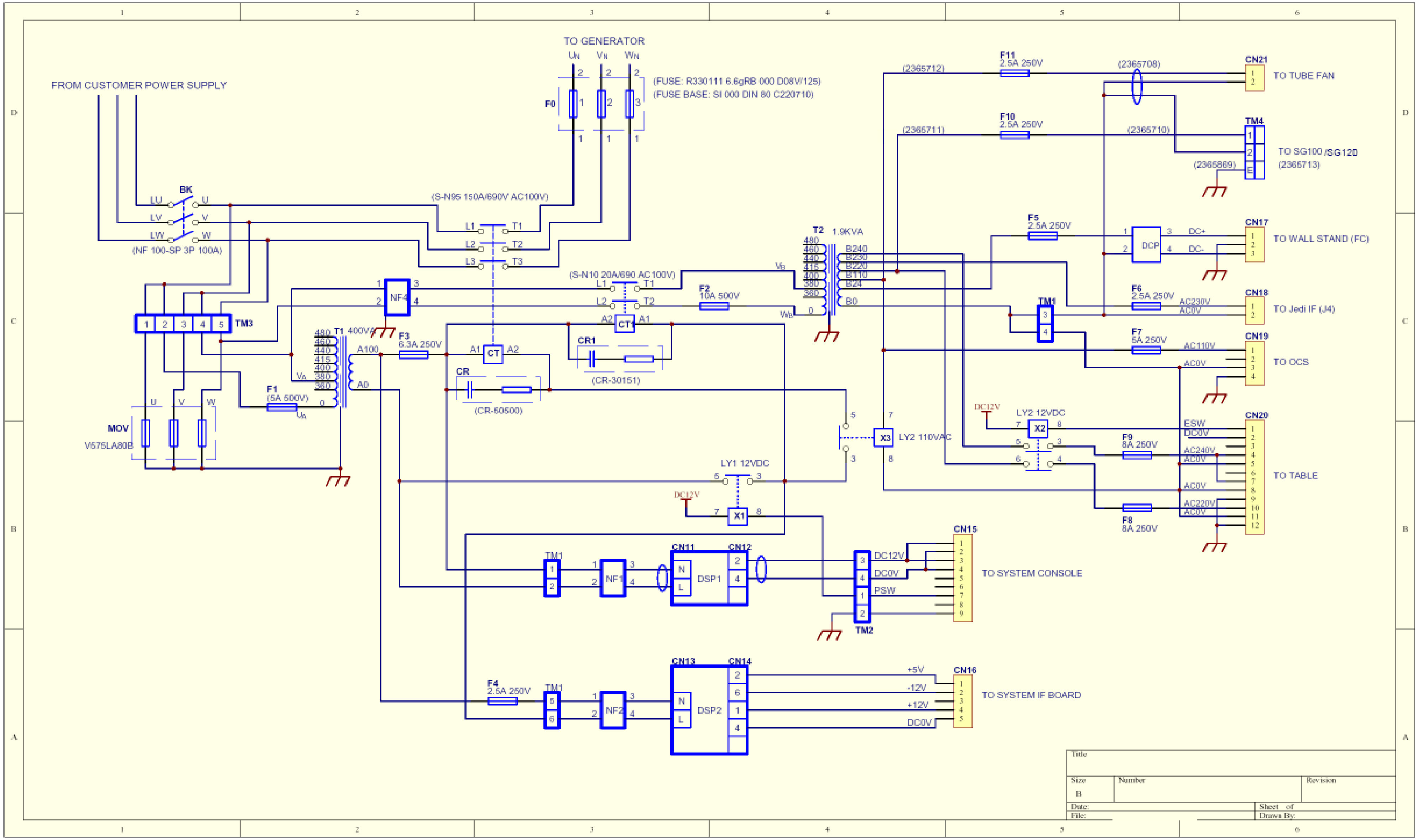
1-1 System Schematics (1) (For systems with Wall Stand 600-0301)


46-329249G3
46-315243G3
2258389
Switch Power Plate
CN3
Higher
CN1
Lower
CN4
2268131
XT Control Board
J1
J101
J3
J4
J100
J6
2258388
3
2J1
2TS4
XT Bridge
Detent Sen.
XT Braker
Tomo Driver
J100 J101
2258387
For MX100 tube: 2380062(rotor)/2403008(thermal)/2269002(HV Cables)/2403009(tube fan)
2258386 (rotor)/2258384 (thermal)/2269002(HV Cables)
(For MX100 :2391017)
2259867
(For MX100 :2391020)
2258381
XT Extension
2124056
2132261
Tomo I/F Bd.
P1
P3
P2
221-2996
221-2997
221-2734
Sys. I/F Bd.
J111
J116
J120
J114
J117
J118
J115
J112
J113
J110
J119
Table 2259298-58(221-2727)
WS 2259298-58(221-2727)
2259298-60(2259977)
OCS Console
X-ray Tube
1
2
46-325296G3
Collimator
2258383
Cassette Tray (2)
Bucky (2)
Ion Chamber (2)
Wall Stand
221-2888
Console
Door
Laptop
Table Bucky
Wall Bucky
AEC1
AEC2
Bucky Power Cable
Jedi Invertor HV Tank
Jedi Generator
Handswitch
Fulcrum Tower
Printer
Operator Console
CN18
CN16
CN15
CN19
PDU
CN20
CN17
Cassette Tray (1)
Bucky (1)
Ion Chamber (1)
2259298-63
(M720092-01)
Table Control Bd.
J6
J5
J105 J100 J101
J107
Tomo Electrnics
Power
J103
Tomo Console
REA00056
REA00057
221-2999
CN2
CN1
2259298-58(221-2727)
2259298-63(M720092-02)
221-2893
221-2886
2259298-56(221-2726)
2259298-57(221-2725)
2259298-66(221-2738)
2259298-65(600-3025)
2259298-73(221-2738)

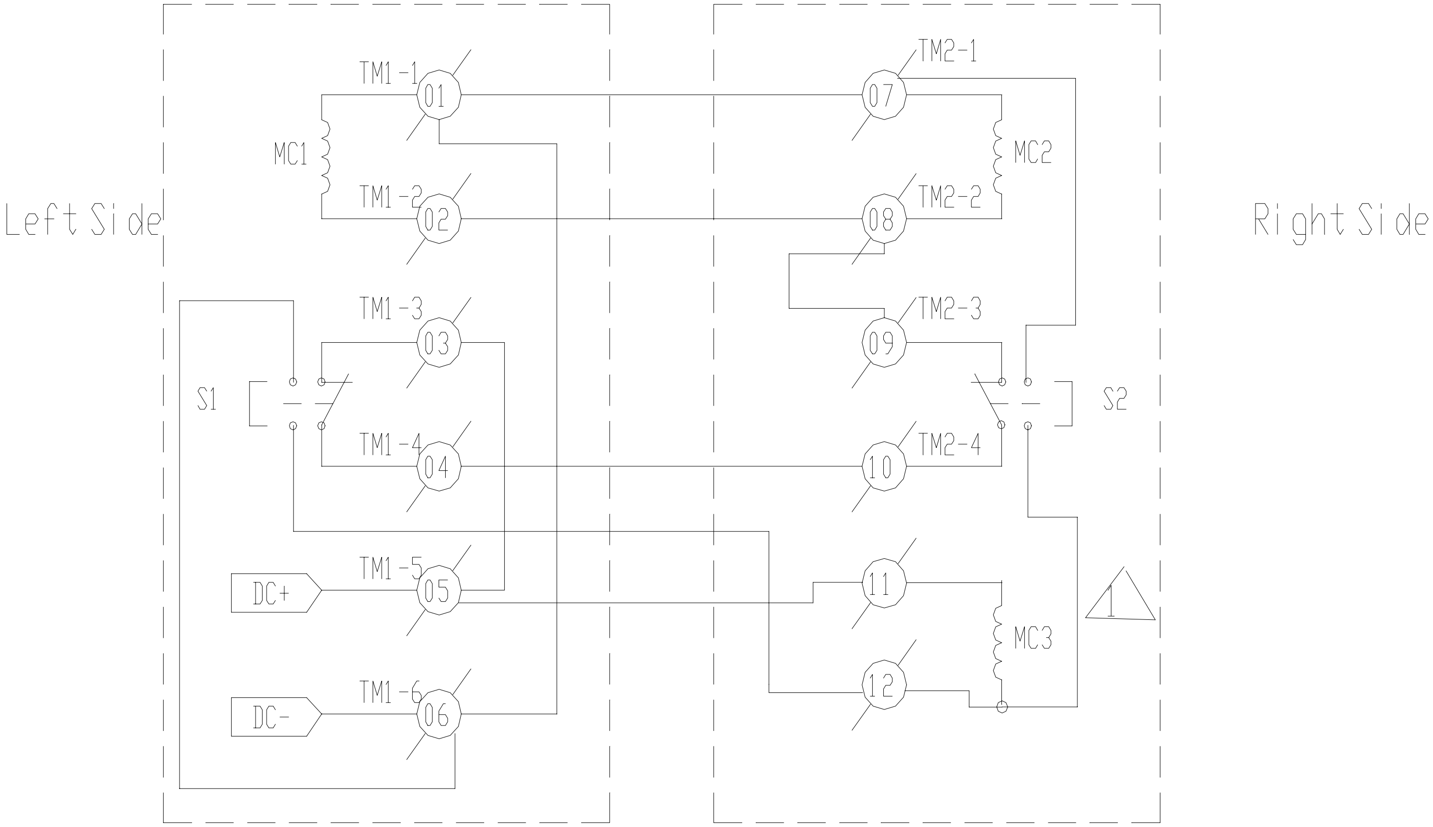
System Schematics (2) (For systems with SG100 Wall Stand 2225849)


46-329249G3
46-315243G3
2258389
Switch Power Plate
CN3
Higher
CN1
Lower
CN4
2268131
XT Control Board
J1
J101
J3
J4
J100
J6
2258388
2J1
2TS4
XT Bridge
Detent Sen.
XT Braker
Tomo Driver
J100
J101
3
2258387
2258386 (rotor)/2258384 (thermal)/2269002(HV Cables)
XT Extension
2259867
2258381
2124056
2132261
Tomo I/F Bd.
P1
P3
P2
221-2996
221-2997
221-2734
OCS Console
Sys. I/F Bd.
J111
J116
J120
J114
J115
J112
J113
J110
J119
J117
J118
J124
Table 2259298-58(221-2727)
WS 2259298-58(221-2727)
2259298-60(2259977)
SG100 2145644-2
1
2
46-325296G3
X-ray Tube
Collimator
2258383
221-2887
221-2888
Console
Door
Laptop
Table Bucky
Wall Bucky
AEC1
AEC2
Bucky Power Cable
Jedi Invertor HV Tank
Jedi Generator
Cassette Tray (2)
Bucky (2)
Ion Chamber (2)
SG100 Wall Stand
Handswitch
Fulcrum Tower
Printer
Operator Console
CN18
CN16
CN15 PDU
CN19
CN21
CN20
CN17
TM4
Tube Fan
2365706
221-2872
221-2886
2259298-63
(M720092-01)
Cassette Tray (1)
Bucky (1)
Ion Chamber (1)
Table Control Bd.
J6
J5
Tomo Electrnics Power
J105
J100
J101
J107
J103
Tomo Console
REA00056
REA00057
221-2999
CN2
CN1
SG100 2151729-2
2259298-56(221-2726)
2259298-57(221-2725)
2259298-66(221-2738)
2259298-58(221-2727)
2145641-2
2145642-2
2259298-65(600-3025)
2140362-2

1-2 PDU Schematics


FROM CUSTOMER POWER SUPPLY
TO GENERATOR
UN VN WN
F0
(FUSE: R330111 6.6gRB 000 D08V/125)
(FUSE BASE: SI 000 DIN 80 C220710)
BK
LU LV LW
U V W
(NF 100-SP 3P 100A)
(S-N95 150A/690V AC100V)
L1 L2 L3
T1 T2 T3
TM3
1 2 3 4 5
MOV
V575LA80B
NF4
T1 400VA
480 460 440 415 400 380 360
VA UA
A100 A0
F1
(5A 500V)
F3
6.3A 250V
CT
A1 A2
CR
(CR-60500)
CR1
(CR-30151)
(S-N10 20A/690 AC100V)
F2
10A 500V
T2 1.9KVA
VB WB
B240 B230 B220 B110 B24 B0
LY1 12VDC
X1
DC12V
LY2 110VAC
X3
LY2 12VDC
X2
(2365712)
F11
2.5A 250V
(2365708)
CN21
TO TUBE FAN
(2365711)
F10
2.5A 250V
(2365710)
TM4
TO SG100 /SG120
(2365869)
(2365713)
F5
2.5A 250V
DCP
DC+ DC-
CN17
TO WALL STAND (FC)
F6
2.5A 250V
AC230V
AC0V
CN18
TO Jedi IF (J4)
TM1
F7
5A 250V
AC110V
AC0V
CN19
TO OCS
ESW
DC0V
F9
8A 250V
AC240V
AC0V
AC220V
F8
8A 250V
CN20
TO TABLE
CN11 CN12
NF1
DSP1
N L
DC12V
DC0V
PSW
TM2
CN15
TO SYSTEM CONSOLE
F4
2.5A 250V
NF2
CN13 CN14
DSP2
+5V
-12V
+12V
DC0V
CN16
TO SYSTEM IF BOARD
Title
Size
B
Number
Revision
Date:
File:
Sheet of
Drawn By:

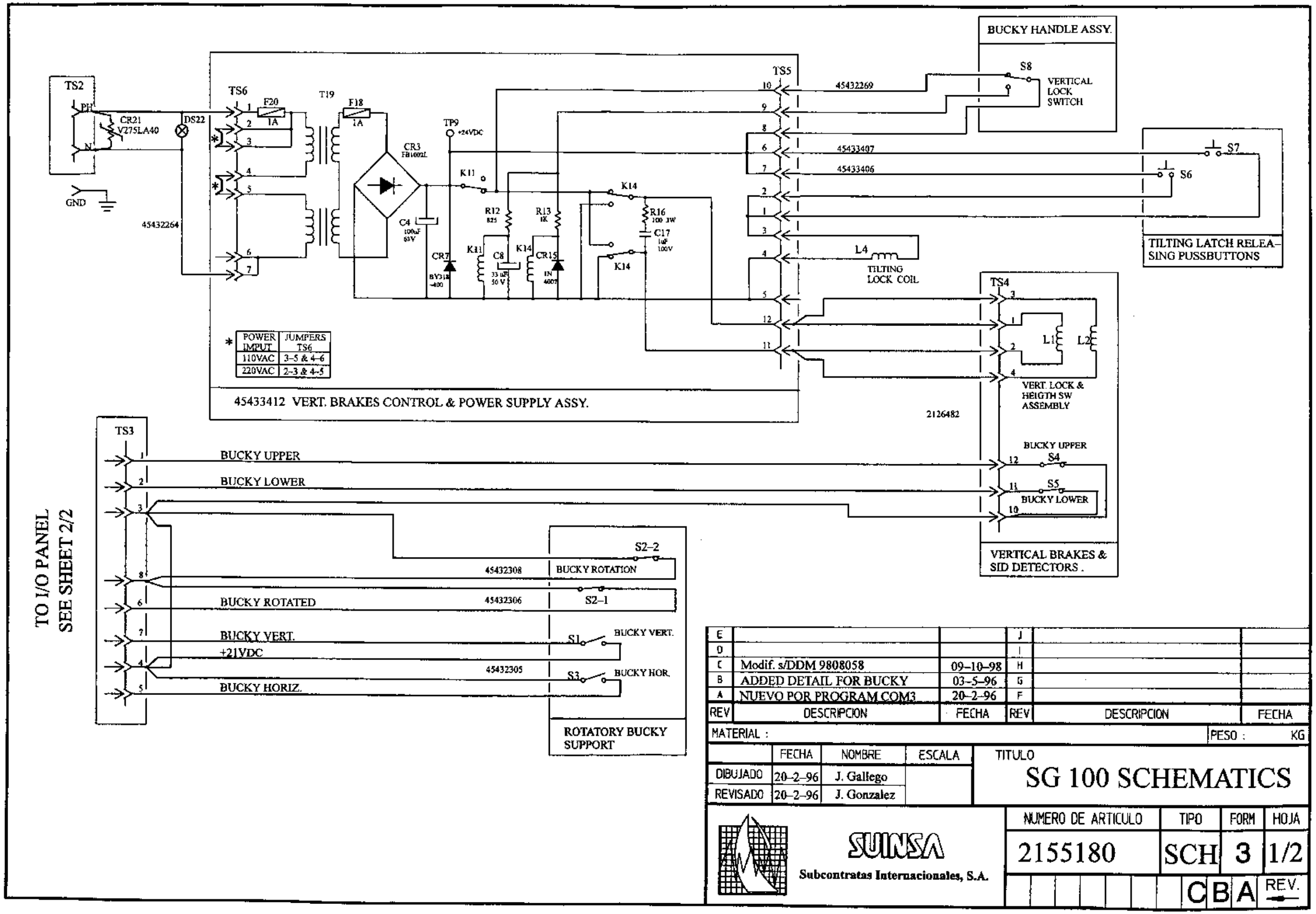
1-3 Wall stand Schematics


Left Side
Right Side
TM1-1
01
TM1-2
02
TM1-3
03
TM1-4
04
TM1-5
05
TM1-6
06
MC1
S1
DC+
DC-
TM2-1
07
TM2-2
08
TM2-3
09
TM2-4
10
11
12
MC2
MC3
S2
1

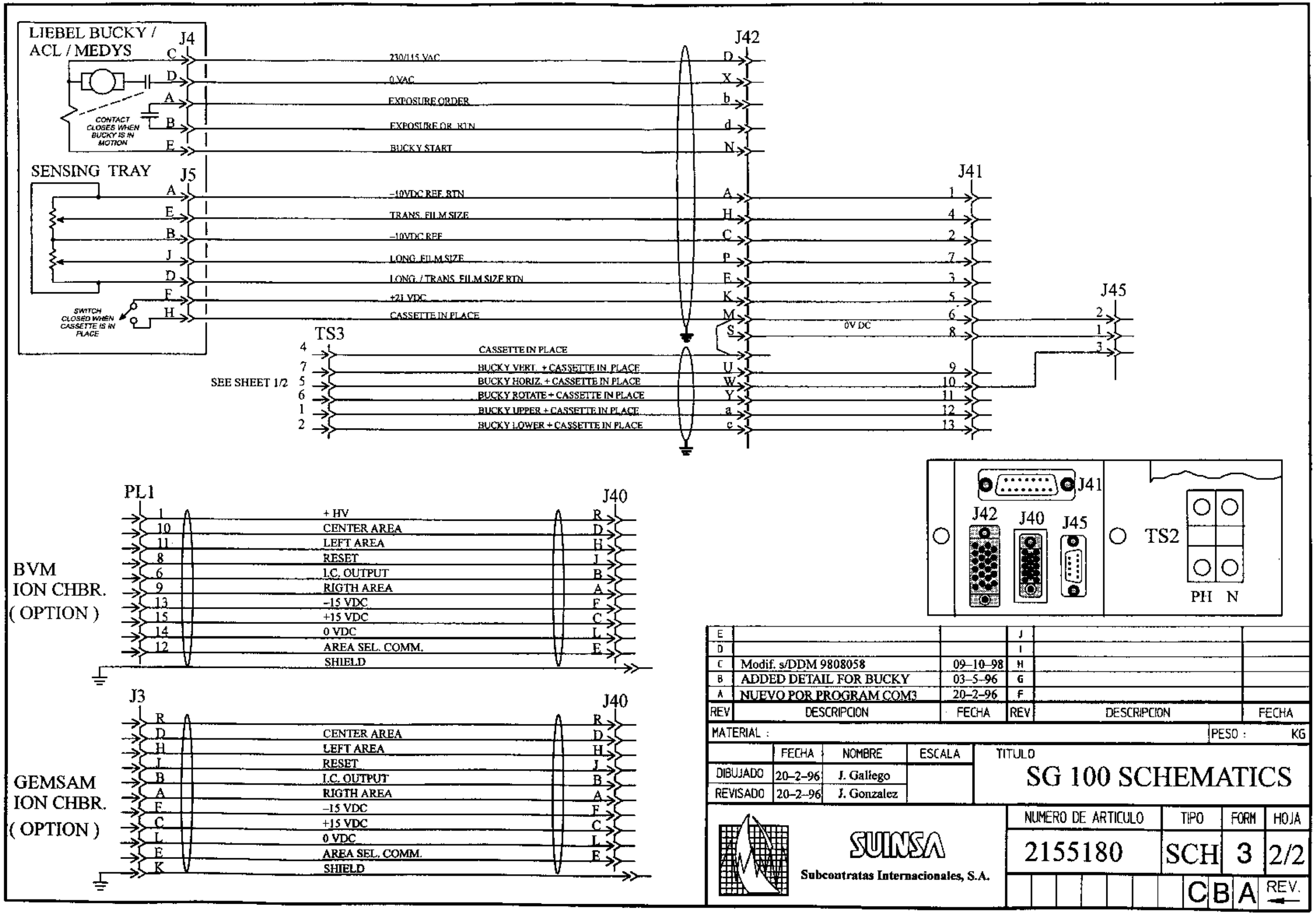
S1	Left Lock
S2	Right Lock
MC1	Left EM Lock
MC2	Right EM Lock
MC3	Power Off Lock

1-4 SG100 Wall stand Schematics (sheet 1 of 2)

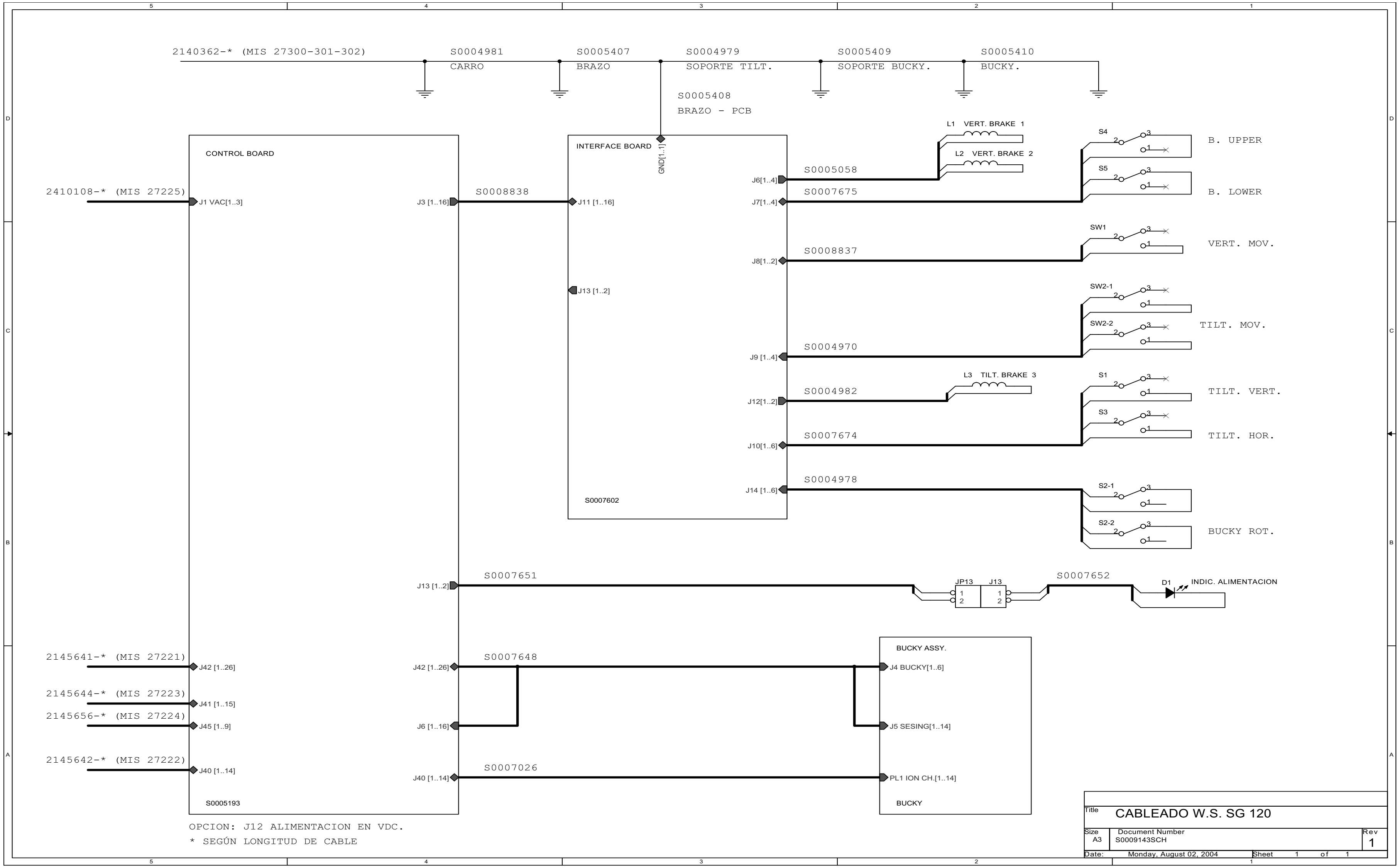
SG-100 BLOCK DIAGRAM (SHEET 1 OF 2)


BUCKY HANDLE ASSY.
S8
VERTICAL LOCK SWITCH
TS5
45432269
45433407
45433406
S7
S6
TILTING LATCH RELEASING PUSSBUTTONS
TS2
PH
N
CR21
V275LA40
DS22
GND
45432264
TS6
F20
1A
T19
F18
1A
TP9
+24VDC
CR3
FB1002L
C4
1000μF
63V
K11
R12
825
R13
1K
K14
R16
100 3W
C17
1μF
100V
CR7
BY218-400
C8
33 μF
50 V
CR15
1N4007
L4
TILTING LOCK COIL
TS4
L1
L2
VERT. LOCK & HEIGTH SW ASSEMBLY
2126482
POWER IMPUT
JUMPERS TS6
110VAC
3-5 & 4-6
220VAC
2-3 & 4-5
45433412 VERT. BRAKES CONTROL & POWER SUPPLY ASSY.
TS3
BUCKY UPPER
BUCKY LOWER
S4
S5
VERTICAL BRAKES & SID DETECTORS .
TO I/O PANEL SEE SHEET 2/2
S2-2
45432308
BUCKY ROTATION
45432306
S2-1
BUCKY ROTATED
BUCKY VERT.
+21VDC
S1
45432305
S3
BUCKY HOR.
BUCKY HORIZ.
ROTATORY BUCKY SUPPORT
E
D
C Modif. s/DDM 9808058 09-10-98
B ADDED DETAIL FOR BUCKY 03-5-96
A NUEVO POR PROGRAM.COM3 20-2-96
J
I
H
G
F
REV DESCRIPCION FECHA
REV DESCRIPCION FECHA
MATERIAL :
PESO : KG
FECHA NOMBRE ESCALA
TITULO
DIBUJADO 20-2-96 J. Gallego
REVISADO 20-2-96 J. Gonzalez
SG 100 SCHEMATICS
SUINSA
Subcontratas Internacionales, S.A.
NUMERO DE ARTICULO 2155180
TIPO SCH
FORM 3
HOJA 1/2
C B A REV.

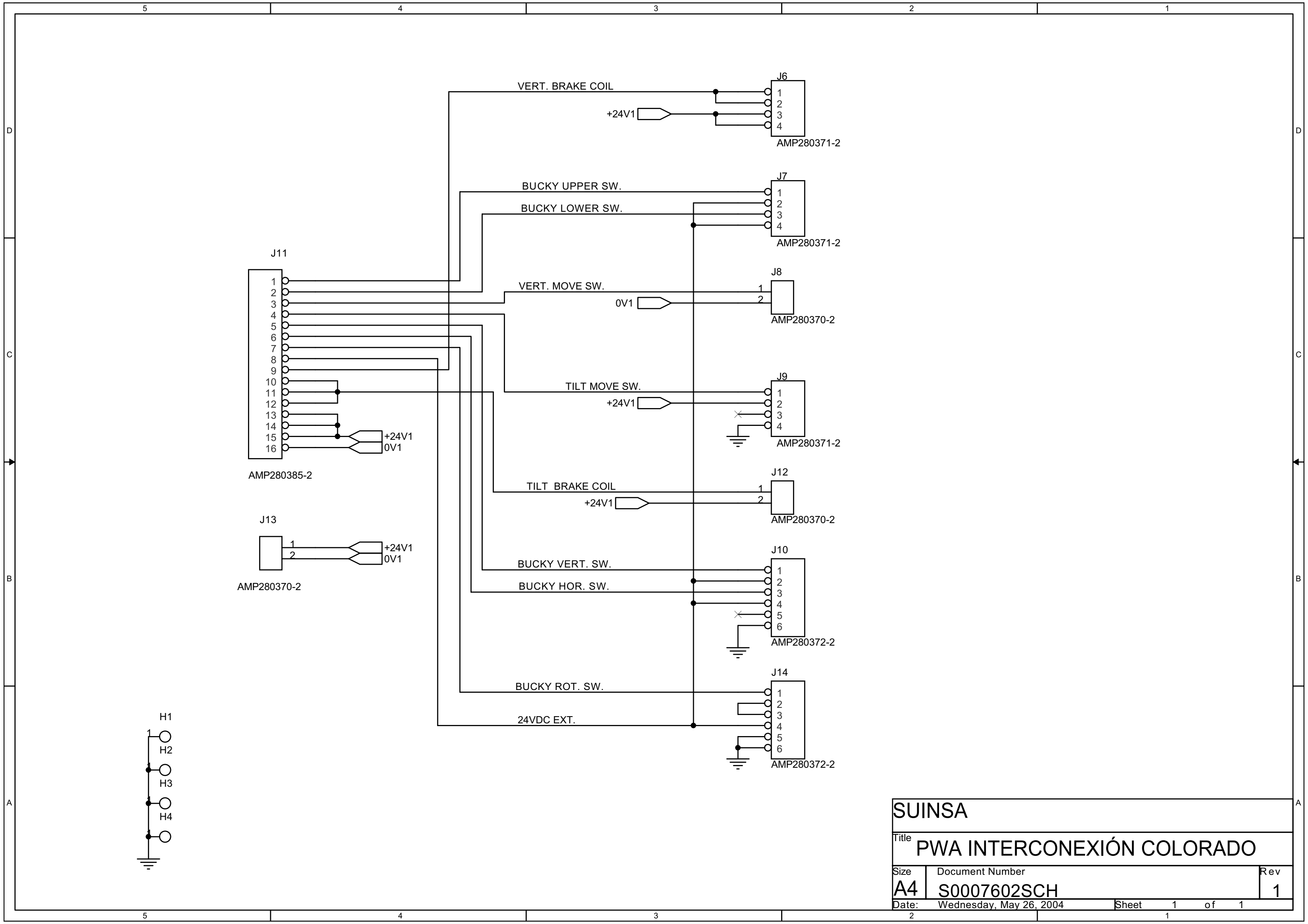
SG–100 BLOCK DIAGRAM (SHEET 2 OF 2)


LIEBEL BUCKY / ACL / MEDYS
J4
CONTACT CLOSES WHEN BUCKY IS IN MOTION
SENSING TRAY
J5
SWITCH CLOSED WHEN CASSETTE IS IN PLACE
J42
J41
J45
230/115 VAC
0 VAC
EXPOSURE ORDER
EXPOSURE OR. RTN
BUCKY START
–10VDC REF. RTN
TRANS. FILM SIZE
–10VDC REF
LONG. FILM SIZE
LONG. / TRANS. FILM SIZE RTN
+21 VDC
CASSETTE IN PLACE
0V DC
TS3
SEE SHEET 1/2
CASSETTE IN PLACE
BUCKY VERT. + CASSETTE IN PLACE
BUCKY HORIZ. + CASSETTE IN PLACE
BUCKY ROTATE + CASSETTE IN PLACE
BUCKY UPPER + CASSETTE IN PLACE
BUCKY LOWER + CASSETTE IN PLACE
PL1
J40
BVM ION CHBR. (OPTION)
+ HV
CENTER AREA
LEFT AREA
RESET
I.C. OUTPUT
RIGTH AREA
–15 VDC
+15 VDC
0 VDC
AREA SEL. COMM.
SHIELD
J3
GEMSAM ION CHBR. (OPTION)
TS2
PH
N
REV
DESCRIPCION
FECHA
C Modif. s/DDM 9808058 09–10–98
B ADDED DETAIL FOR BUCKY 03–5–96
A NUEVO POR PROGRAM COM3 20–2–96
MATERIAL :
PESO : KG
FECHA
NOMBRE
ESCALA
TITULO
DIBUJADO 20–2–96 J. Gallego
REVISADO 20–2–96 J. Gonzalez
SG 100 SCHEMATICS
SUINSA
Subcontratas Internacionales, S.A.
NUMERO DE ARTICULO
2155180
TIPO
SCH
FORM
3
HOJA
2/2
C B A REV.

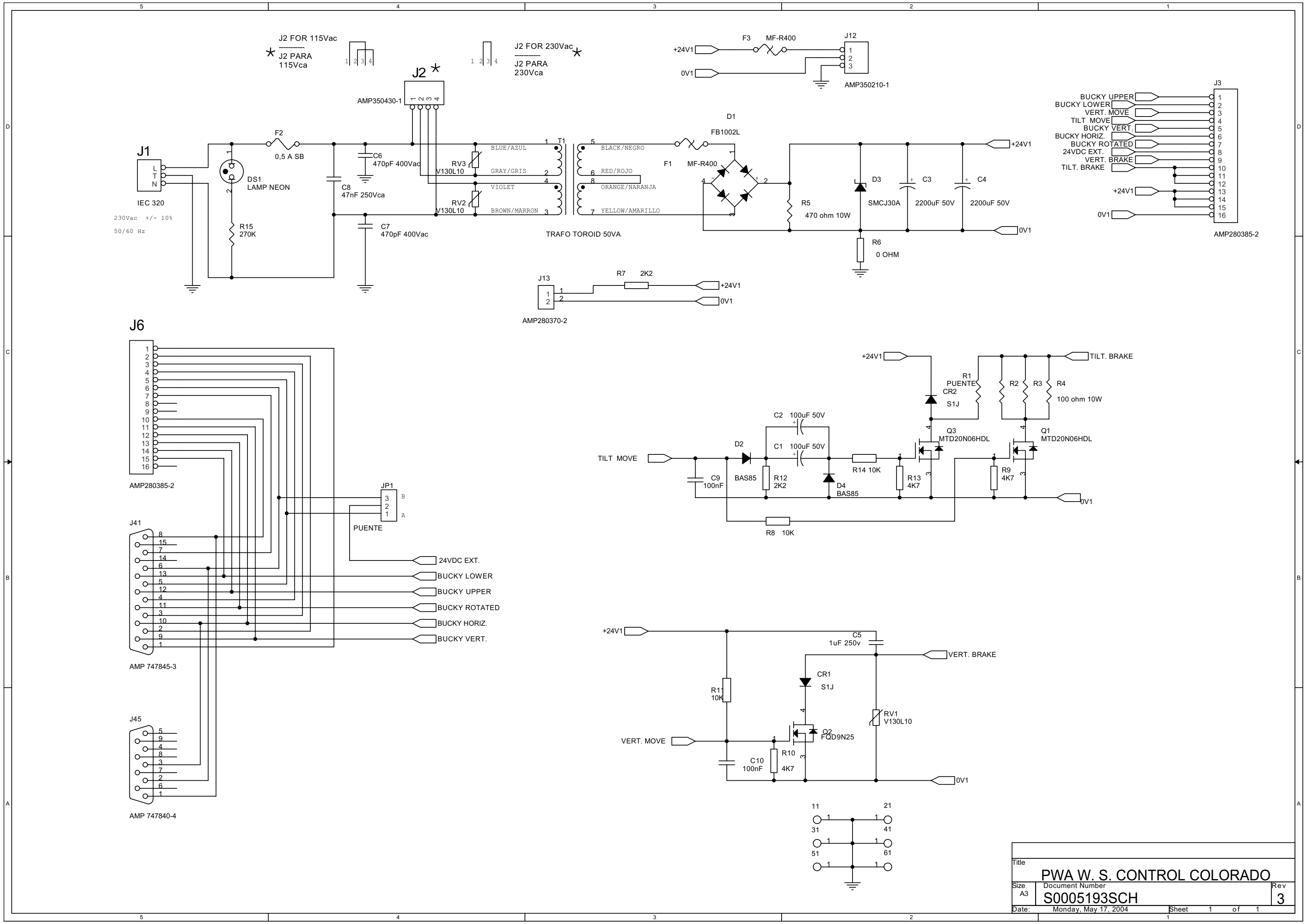
1-5 **SG120 Wall Stand Schematics (sheet 1 of 3)**


2140362-* (MIS 27300-301-302)
S0004981
CARRO
S0005407
BRAZO
S0004979
SOPORTE TILT.
S0005409
SOPORTE BUCKY.
S0005410
BUCKY.
S0005408
BRAZO - PCB
CONTROL BOARD
2410108-* (MIS 27225)
J1 VAC[1..3]
J3 [1..16]
S0008838
INTERFACE BOARD
GND[1..1]
J11 [1..16]
J13 [1..2]
J6[1..4]
J7[1..4]
J8[1..2]
J9 [1..4]
J12[1..2]
J10[1..6]
J14 [1..6]
S0007602
L1 VERT. BRAKE 1
L2 VERT. BRAKE 2
S0005058
S0007675
S4
S5
B. UPPER
B. LOWER
SW1
S0008837
VERT. MOV.
SW2-1
SW2-2
TILT. MOV.
S0004970
L3 TILT. BRAKE 3
S0004982
S1
TILT. VERT.
S3
S0007674
TILT. HOR.
S0004978
S2-1
S2-2
BUCKY ROT.
J13 [1..2]
S0007651
JP13
J13
S0007652
D1
INDIC. ALIMENTACION
2145641-* (MIS 27221)
J42 [1..26]
J42 [1..26]
S0007648
BUCKY ASSY.
J4 BUCKY[1..6]
2145644-* (MIS 27223)
J41 [1..15]
2145656-* (MIS 27224)
J45 [1..9]
J6 [1..16]
J5 SESING[1..14]
2145642-* (MIS 27222)
J40 [1..14]
J40 [1..14]
S0007026
PL1 ION CH.[1..14]
S0005193
BUCKY
OPCION: J12 ALIMENTACION EN VDC.
* SEGÚN LONGITUD DE CABLE
Title
CABLEADO W.S. SG 120
Size
A3
Document Number
S0009143SCH
Rev
1
Date:
Monday, August 02, 2004
Sheet 1 of 1
5
4
3
2
1
D
C
B
A

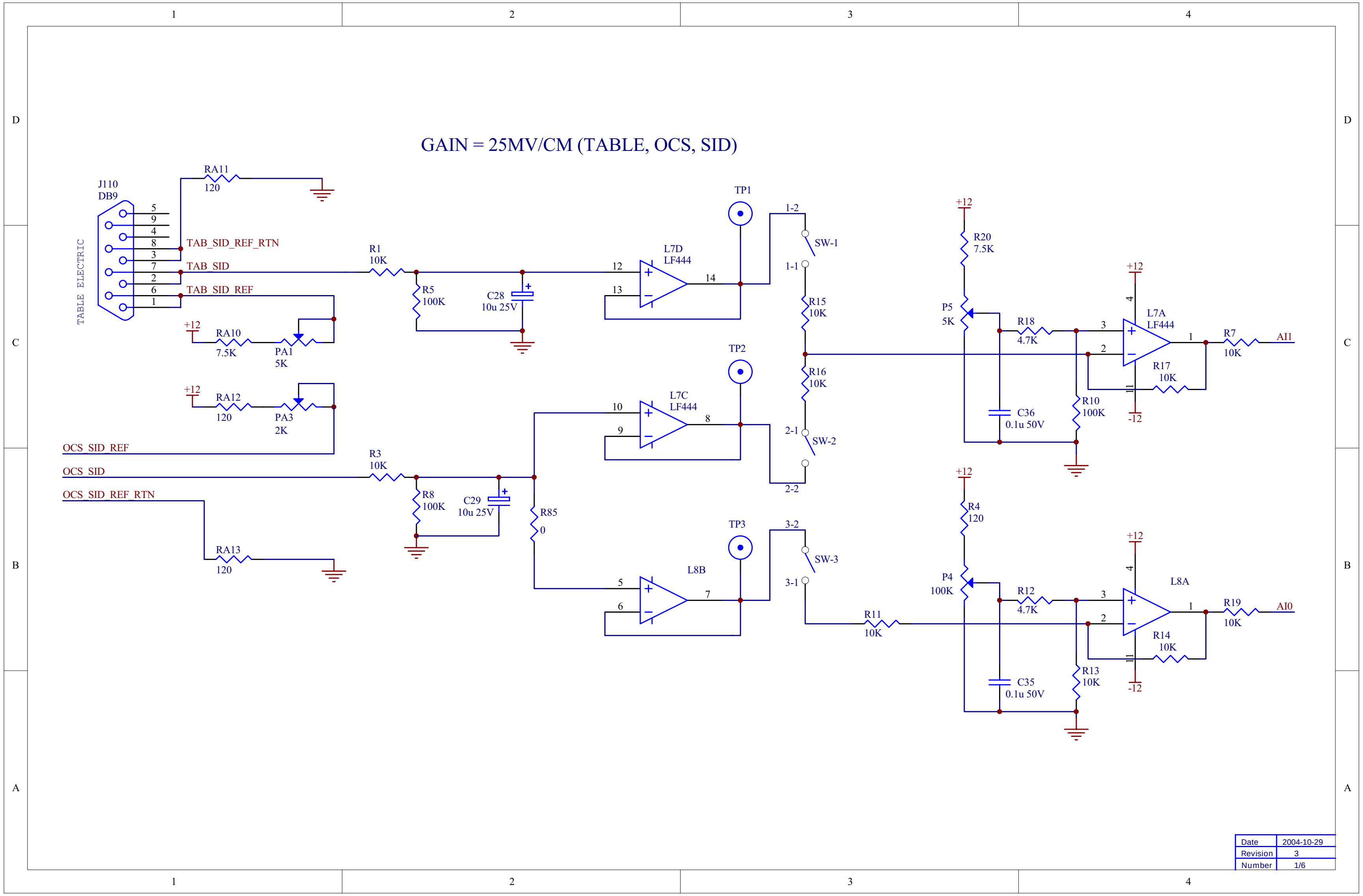
SG120 Wall Stand Schematics (sheet 2 of 3)


VERT. BRAKE COIL
+24V1
J6
AMP280371-2
BUCKY UPPER SW.
BUCKY LOWER SW.
J7
AMP280371-2
J11
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
+24V1
0V1
AMP280385-2
VERT. MOVE SW.
0V1
J8
AMP280370-2
TILT MOVE SW.
+24V1
J9
AMP280371-2
TILT BRAKE COIL
+24V1
J12
AMP280370-2
J13
+24V1
0V1
AMP280370-2
BUCKY VERT. SW.
BUCKY HOR. SW.
J10
AMP280372-2
BUCKY ROT. SW.
24VDC EXT.
J14
AMP280372-2
H1
H2
H3
H4
SUINSA
Title
PWA INTERCONEXIÓN COLORADO
Size
A4
Document Number
S0007602SCH
Rev
1
Date: Wednesday, May 26, 2004
Sheet 1 of 1

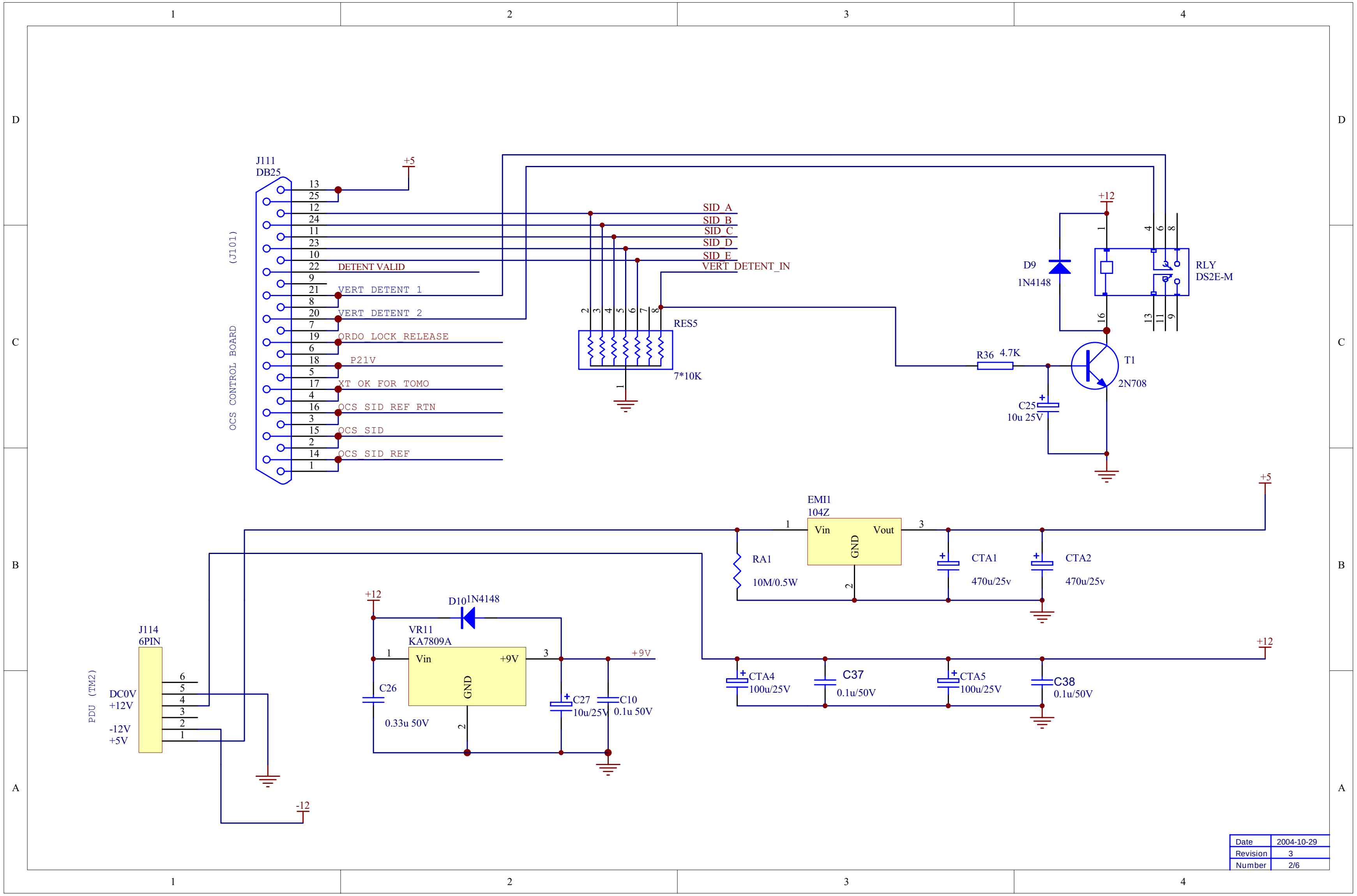
SG120 Wall Stand Schematics (sheet 3 of 3)


J2 FOR 115Vac
J2 PARA 115Vca
J2
AMP350430-1
J2 FOR 230Vac
J2 PARA 230Vca
J1
L
T
N
IEC 320
230Vac +/- 10%
50/60 Hz
F2
0,5 A SB
DS1
LAMP NEON
R15
270K
C6
470pF 400Vac
C8
47nF 250Vca
C7
470pF 400Vac
RV3
V130L10
RV2
V130L10
T1
BLUE/AZUL
GRAY/GRIS
VIOLET
BROWN/MARRON
BLACK/NEGRO
RED/ROJO
ORANGE/NARANJA
YELLOW/AMARILLO
TRAFO TOROID 50VA
F1
MF-R400
D1
FB1002L
R5
470 ohm 10W
D3
SMCJ30A
C3
2200uF 50V
C4
2200uF 50V
R6
0 OHM
+24V1
0V1
F3
MF-R400
J12
AMP350210-1
J3
BUCKY UPPER
BUCKY LOWER
VERT. MOVE
TILT MOVE
BUCKY VERT
BUCKY HORIZ.
BUCKY ROTATED
24VDC EXT.
VERT. BRAKE
TILT. BRAKE
AMP280385-2
J13
R7
2K2
AMP280370-2
J6
AMP280385-2
JP1
PUENTE
J41
AMP 747845-3
J45
AMP 747840-4
24VDC EXT.
BUCKY LOWER
BUCKY UPPER
BUCKY ROTATED
BUCKY HORIZ.
BUCKY VERT.
TILT. BRAKE
R1
PUENTE
CR2
S1J
R2
R3
R4
100 ohm 10W
Q3
MTD20N06HDL
Q1
MTD20N06HDL
C2 100uF 50V
C1 100uF 50V
D2
BAS85
TILT MOVE
C9
100nF
R12
2K2
D4
BAS85
R14 10K
R13
4K7
R9
4K7
R8 10K
C5
1uF 250v
VERT. BRAKE
CR1
S1J
R11
10K
RV1
V130L10
Q2
FQD9N25
VERT. MOVE
C10
100nF
R10
4K7
11
21
31
41
51
61
Title
PWA W. S. CONTROL COLORADO
Size A3
Document Number
S0005193SCH
Rev 3
Date: Monday, May 17, 2004
Sheet 1 of 1

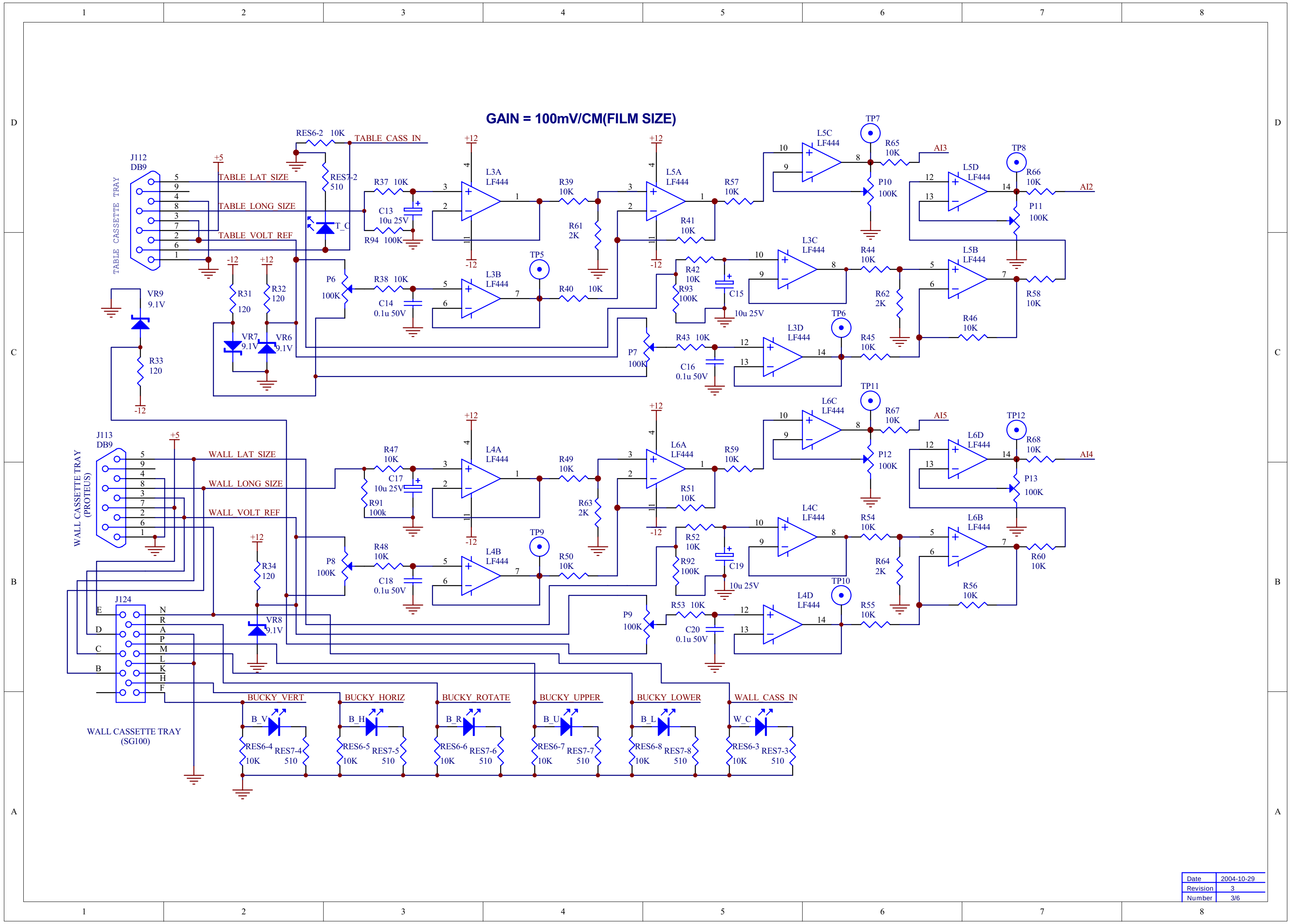
1-6 **System I/F Board (1)**


GAIN = 25MV/CM (TABLE, OCS, SID)
J110
DB9
TABLE ELECTRIC
5
9
4
8
3
7
2
6
1
RA11
120
TAB_SID_REF_RTN
TAB_SID
TAB_SID_REF
+12
RA10
7.5K
PA1
5K
+12
RA12
120
PA3
2K
OCS_SID_REF
OCS_SID
OCS_SID_REF_RTN
RA13
120
R1
10K
R5
100K
C28
10u 25V
R3
10K
R8
100K
C29
10u 25V
R85
0
L7D
LF444
12
13
14
L7C
LF444
10
9
8
L8B
5
6
7
TP1
TP2
TP3
1-2
SW-1
1-1
R15
10K
R16
10K
2-1
SW-2
2-2
3-2
SW-3
3-1
R11
10K
+12
R20
7.5K
P5
5K
R18
4.7K
C36
0.1u 50V
R10
100K
+12
4
L7A
LF444
3
2
1
11
-12
R17
10K
R7
10K
AI1
+12
R4
120
P4
100K
R12
4.7K
C35
0.1u 50V
R13
10K
+12
4
L8A
3
2
1
11
-12
R14
10K
R19
10K
AI0
1
2
3
4
D
C
B
A
Date
2004-10-29
Revision
3
Number
1/6

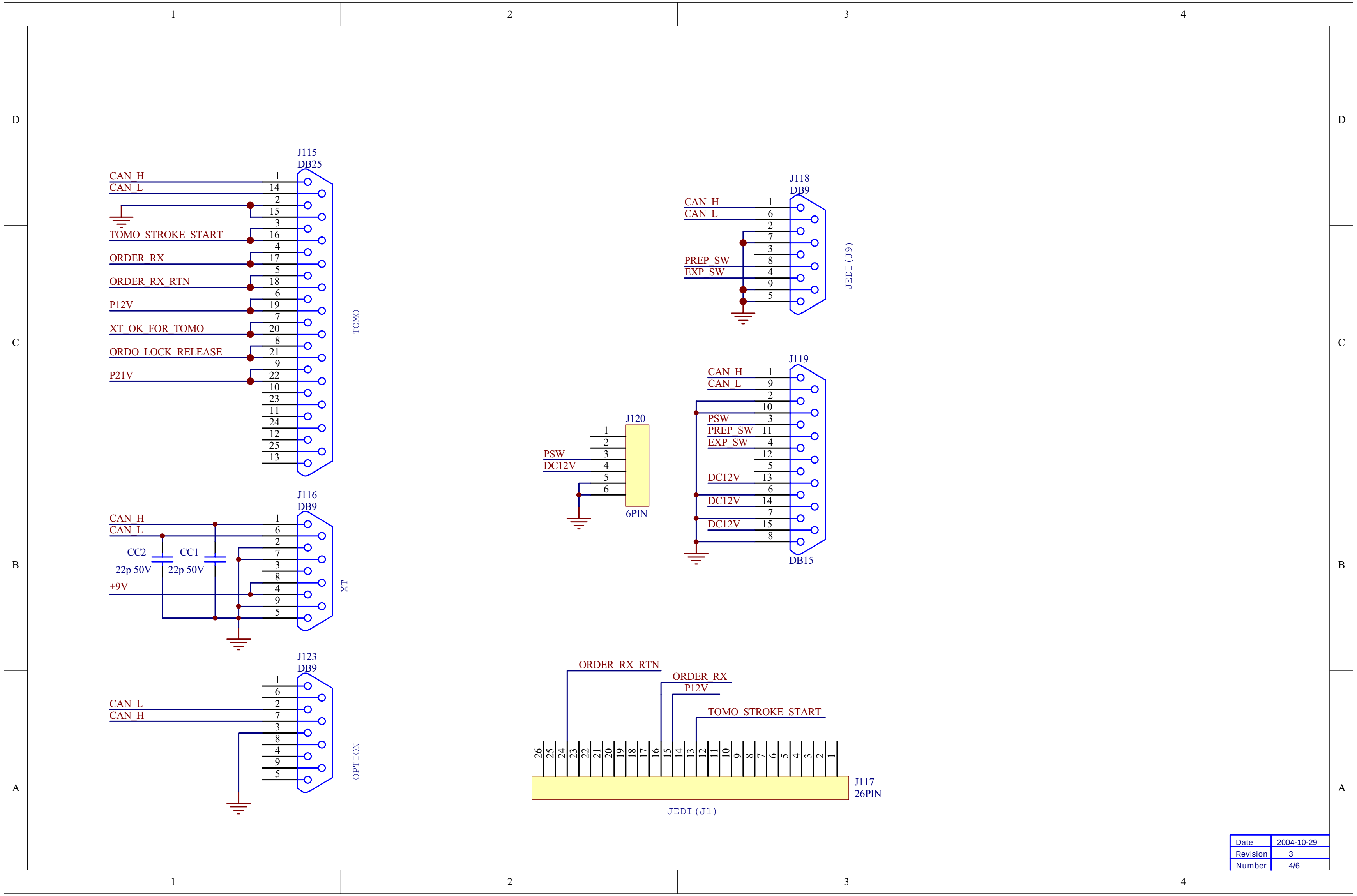
System I/F Board (2)


J111
DB25
(J101)
OCS CONTROL BOARD
+5
DETENT VALID
VERT DETENT 1
VERT DETENT 2
ORDO LOCK RELEASE
P21V
XT OK FOR TOMO
OCS SID REF RTN
OCS SID
OCS SID REF
SID_A
SID_B
SID_C
SID_D
SID_E
VERT_DETENT_IN
RES5
7*10K
+12
D9
1N4148
RLY
DS2E-M
R36 4.7K
T1
2N708
C25
10u 25V
EMI1
104Z
Vin
Vout
GND
RA1
10M/0.5W
CTA1
470u/25v
CTA2
470u/25v
+5
J114
6PIN
PDU (TM2)
DC0V
+12V
-12V
+5V
-12
+12
D10 1N4148
VR11
KA7809A
Vin
+9V
GND
C26
0.33u 50V
C27
10u/25V
C10
0.1u 50V
+9V
CTA4
100u/25V
C37
0.1u/50V
CTA5
100u/25V
C38
0.1u/50V
+12
Date 2004-10-29
Revision 3
Number 2/6

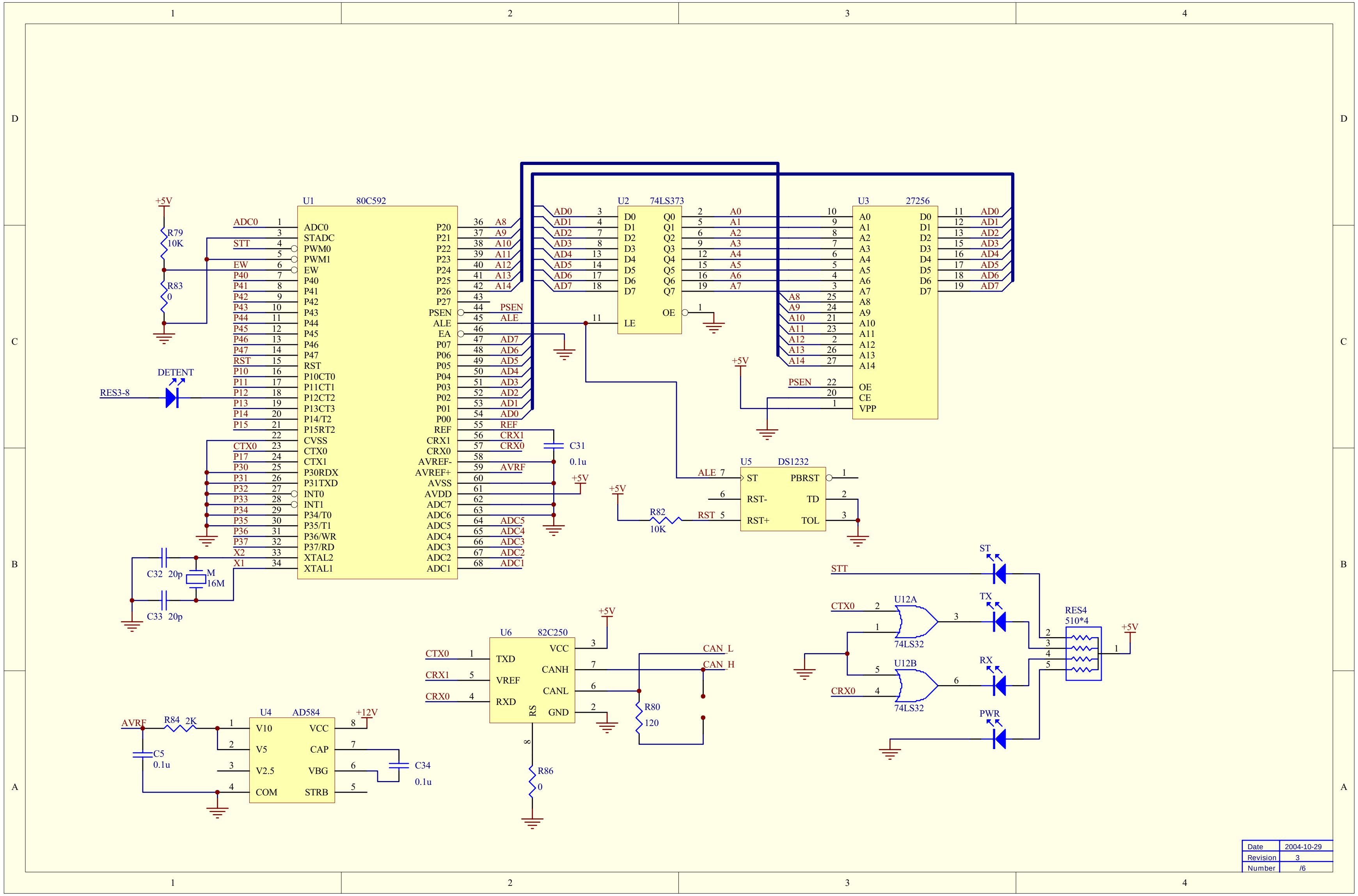
System I/F Board (3)


GAIN = 100mV/CM(FILM SIZE)
J112
DB9
TABLE CASSETTE TRAY
TABLE_LAT_SIZE
TABLE_LONG_SIZE
TABLE_VOLT_REF
TABLE_CASS_IN
RES6-2 10K
RES7-2 510
T_C
R37 10K
C13 10u 25V
R94 100K
L3A LF444
L3B LF444
R39 10K
R40 10K
R61 2K
L5A LF444
R41 10K
R57 10K
L5C LF444
TP7
R65 10K
AI3
P10 100K
L5D LF444
TP8
R66 10K
AI2
P11 100K
R42 10K
R93 100K
C15 10u 25V
L3C LF444
R44 10K
R62 2K
L5B LF444
R58 10K
R46 10K
L3D LF444
TP6
R43 10K
C16 0.1u 50V
R45 10K
P7 100K
TP5
P6 100K
R38 10K
C14 0.1u 50V
VR9 9.1V
R33 120
R31 120
R32 120
VR7 9.1V
VR6 9.1V
J113
DB9
WALL CASSETTE TRAY (PROTEUS)
WALL_LAT_SIZE
WALL_LONG_SIZE
WALL_VOLT_REF
R47 10K
C17 10u 25V
R91 100k
L4A LF444
L4B LF444
R49 10K
R63 2K
R50 10K
L6A LF444
R51 10K
R59 10K
L6C LF444
TP11
R67 10K
AI5
P12 100K
L6D LF444
TP12
R68 10K
AI4
P13 100K
R52 10K
R92 100K
C19 10u 25V
L4C LF444
R54 10K
R64 2K
L6B LF444
R60 10K
R56 10K
L4D LF444
TP10
R53 10K
C20 0.1u 50V
R55 10K
P9 100K
TP9
P8 100K
R48 10K
C18 0.1u 50V
R34 120
VR8 9.1V
J124
WALL CASSETTE TRAY (SG100)
BUCKY_VERT
BUCKY_HORIZ
BUCKY_ROTATE
BUCKY_UPPER
BUCKY_LOWER
WALL_CASS_IN
B_V
B_H
B_R
B_U
B_L
W_C
RES6-4 10K
RES7-4 510
RES6-5 10K
RES7-5 510
RES6-6 10K
RES7-6 510
RES6-7 10K
RES7-7 510
RES6-8 10K
RES7-8 510
RES6-3 10K
RES7-3 510
+12
-12
+5
Date 2004-10-29
Revision 3
Number 3/6

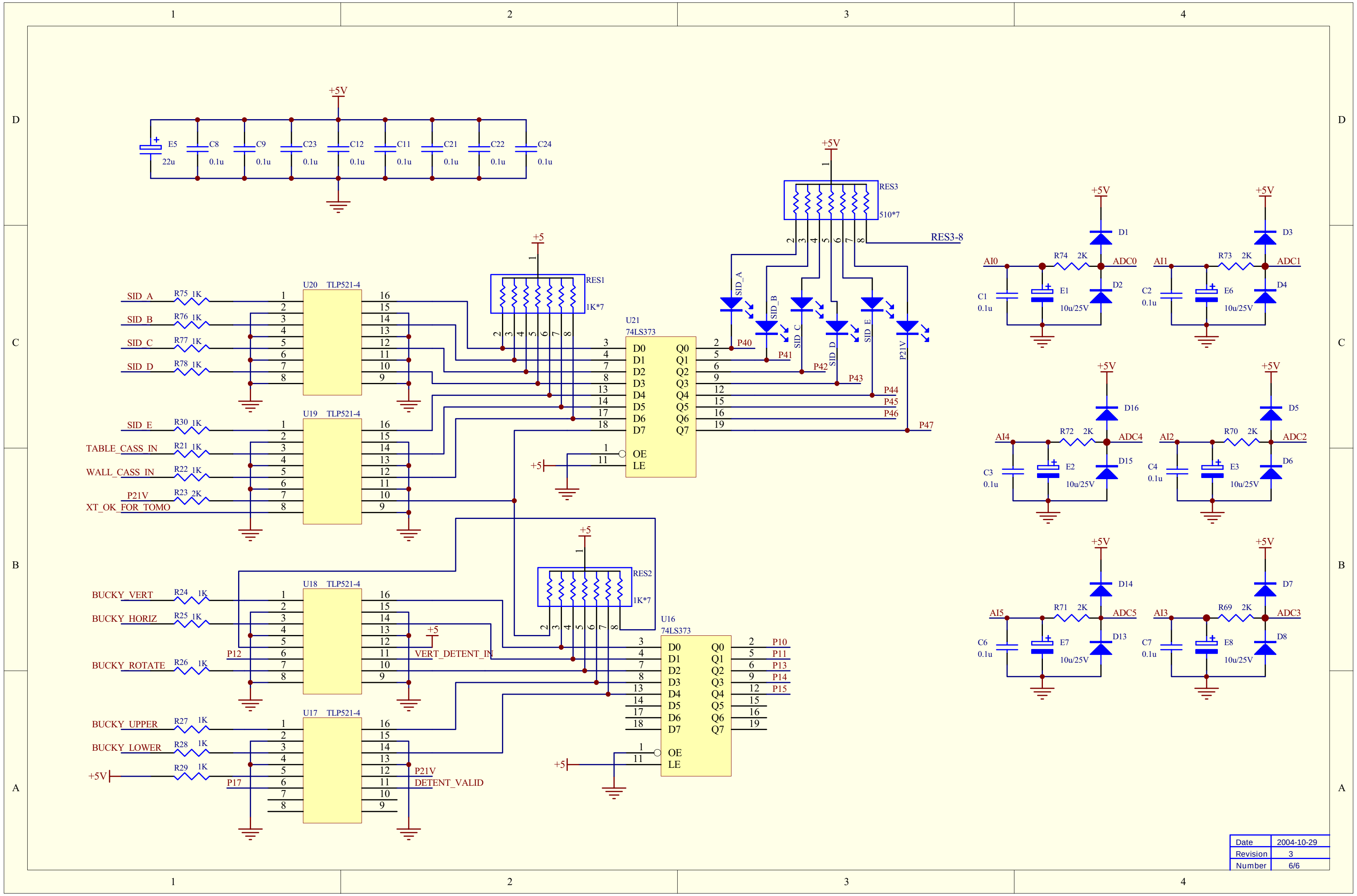
System I/F Board (4)


1
2
3
4
D
C
B
A
J115
DB25
CAN_H
CAN_L
TOMO_STROKE_START
ORDER_RX
ORDER_RX_RTN
P12V
XT_OK_FOR_TOMO
ORDO_LOCK_RELEASE
P21V
1
14
2
15
3
16
4
17
5
18
6
19
7
20
8
21
9
22
10
23
11
24
12
25
13
TOMO
J116
DB9
CAN_H
CAN_L
CC2
CC1
22p 50V
22p 50V
+9V
XT
J123
DB9
CAN_L
CAN_H
OPTION
J118
DB9
CAN_H
CAN_L
PREP_SW
EXP_SW
JEDI(J9)
J119
CAN_H
CAN_L
PSW
PREP_SW
EXP_SW
DC12V
DC12V
DC12V
DB15
J120
6PIN
PSW
DC12V
ORDER_RX_RTN
ORDER_RX
P12V
TOMO_STROKE_START
J117
26PIN
JEDI(J1)
Date 2004-10-29
Revision 3
Number 4/6

System I/F Board (5)


U1 80C592
U2 74LS373
U3 27256
U4 AD584
U5 DS1232
U6 82C250
U12A 74LS32
U12B 74LS32
R79 10K
R83 0
R82 10K
R80 120
R84 2K
R86 0
RES4 510*4
C31 0.1u
C32 20p
C33 20p
C34 0.1u
C5 0.1u
M 16M
DETENT
RES3-8
ST
TX
RX
PWR
STT
CTX0
CRX0
CRX1
CAN_L
CAN_H
AVRF
ALE
RST
PSEN
+5V
+12V
Date 2004-10-29
Revision 3
Number /6

System I/F Board (6)


+5V
E5 22u
C8 0.1u
C9 0.1u
C23 0.1u
C12 0.1u
C11 0.1u
C21 0.1u
C22 0.1u
C24 0.1u
RES1 1K*7
RES2 1K*7
RES3 510*7
RES3-8
U20 TLP521-4
U19 TLP521-4
U18 TLP521-4
U17 TLP521-4
U21 74LS373
U16 74LS373
D0 D1 D2 D3 D4 D5 D6 D7
Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7
OE
LE
SID_A
SID_B
SID_C
SID_D
SID_E
TABLE_CASS_IN
WALL_CASS_IN
P21V
XT_OK_FOR_TOMO
R75 1K
R76 1K
R77 1K
R78 1K
R30 1K
R21 1K
R22 1K
R23 2K
BUCKY_VERT
BUCKY_HORIZ
BUCKY_ROTATE
BUCKY_UPPER
BUCKY_LOWER
R24 1K
R25 1K
R26 1K
R27 1K
R28 1K
R29 1K
P12
P17
VERT_DETENT_IN
DETENT_VALID
P40 P41 P42 P43 P44 P45 P46 P47
P10 P11 P13 P14 P15
AI0 R74 2K ADC0 D1 D2 C1 0.1u E1 10u/25V
AI1 R73 2K ADC1 D3 D4 C2 0.1u E6 10u/25V
AI4 R72 2K ADC4 D16 D15 C3 0.1u E2 10u/25V
AI2 R70 2K ADC2 D5 D6 C4 0.1u E3 10u/25V
AI5 R71 2K ADC5 D14 D13 C6 0.1u E7 10u/25V
AI3 R69 2K ADC3 D7 D8 C7 0.1u E8 10u/25V
1 2 3 4
A B C D
Date 2004-10-29
Revision 3
Number 6/6

1-7 **Table Schematics**

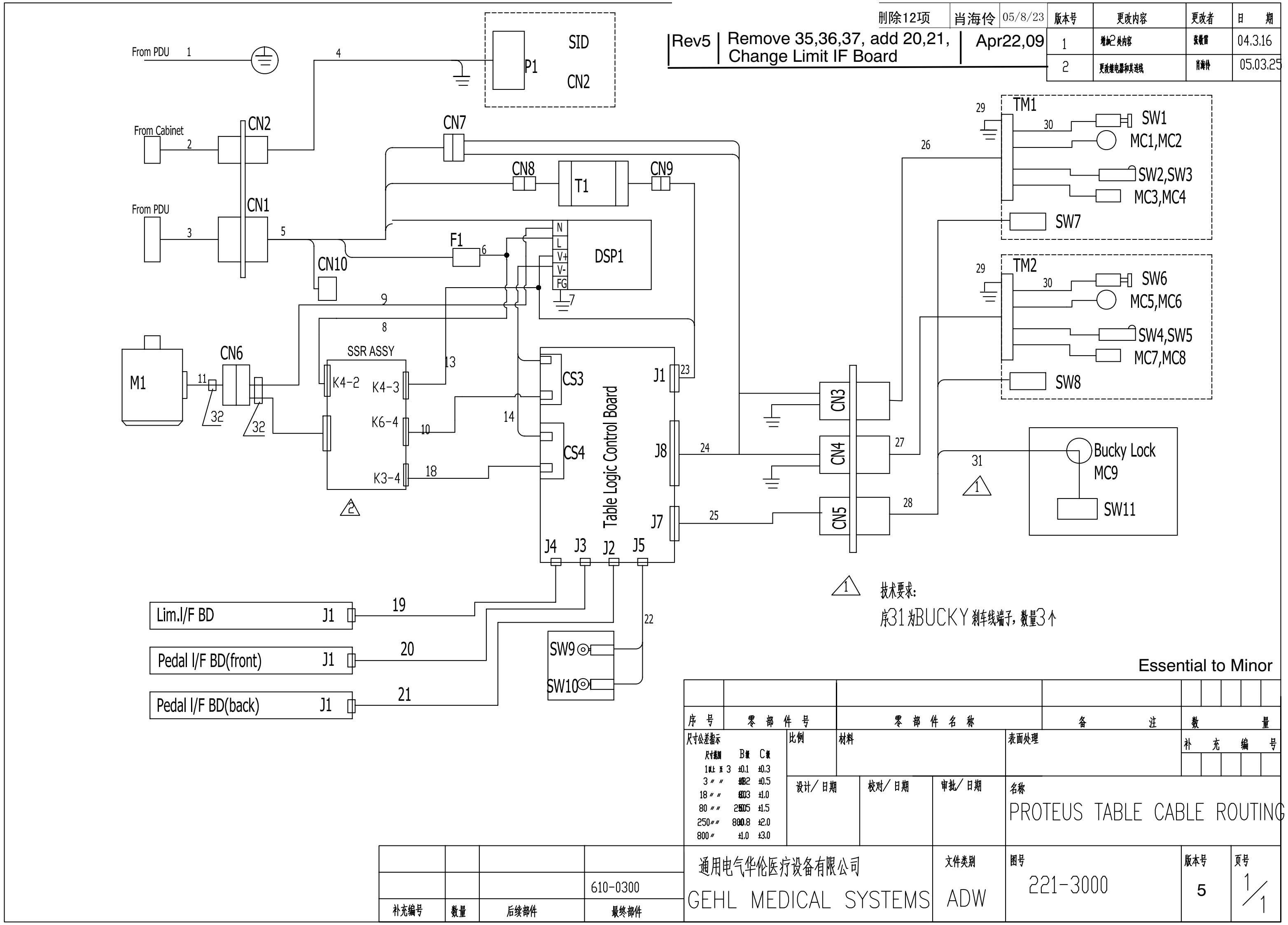

删除12项
肖海伶
05/8/23
Rev5
Remove 35,36,37, add 20,21,
Change Limit IF Board
Apr22,09
版本号
更改内容
更改者
日 期
1
增加2处内容
张敏雷
04.3.16
2
更改继电器和其连线
肖海伶
05.03.25
From PDU
1
4
SID
P1
CN2
From Cabinet
2
CN2
From PDU
3
CN1
5
CN7
CN8
T1
CN9
N
L
V+
V-
FG
DSP1
F1
6
7
CN10
9
8
SSR ASSY
K4-2
K4-3
K6-4
K3-4
10
13
14
18
M1
CN6
11
32
32
2
CS3
CS4
Table Logic Control Board
J1
23
J8
24
J7
25
J4
J3
J2
J5
CN3
CN4
CN5
26
27
28
29
30
TM1
SW1
MC1,MC2
SW2,SW3
MC3,MC4
SW7
29
30
TM2
SW6
MC5,MC6
SW4,SW5
MC7,MC8
SW8
31
1
Bucky Lock
MC9
SW11
Lim.I/F BD
J1
19
Pedal I/F BD(front)
J1
20
Pedal I/F BD(back)
J1
21
22
SW9
SW10
1
技术要求:
序31为BUCKY刹车线端子，数量3个
Essential to Minor
序 号
零 部 件 号
零 部 件 名 称
备 注
数 量
尺寸公差指示
尺寸范围
B级
C级
1以上至3
±0.1
±0.3
3 〃 〃
±0.2
±0.5
18 〃 〃
±0.3
±1.0
80 〃 〃
±0.5
±1.5
250〃〃
±0.8
±2.0
800〃
±1.0
±3.0
比例
材料
表面处理
补 充 编 号
设计/日期
校对/日期
审批/日期
名称
PROTEUS TABLE CABLE ROUTING
610-0300
补充编号
数量
后续部件
最终部件
通用电气华伦医疗设备有限公司
GEHL MEDICAL SYSTEMS
文件类别
ADW
图号
221-3000
版本号
5
页号
1/1

Table Logic Control Board (1)

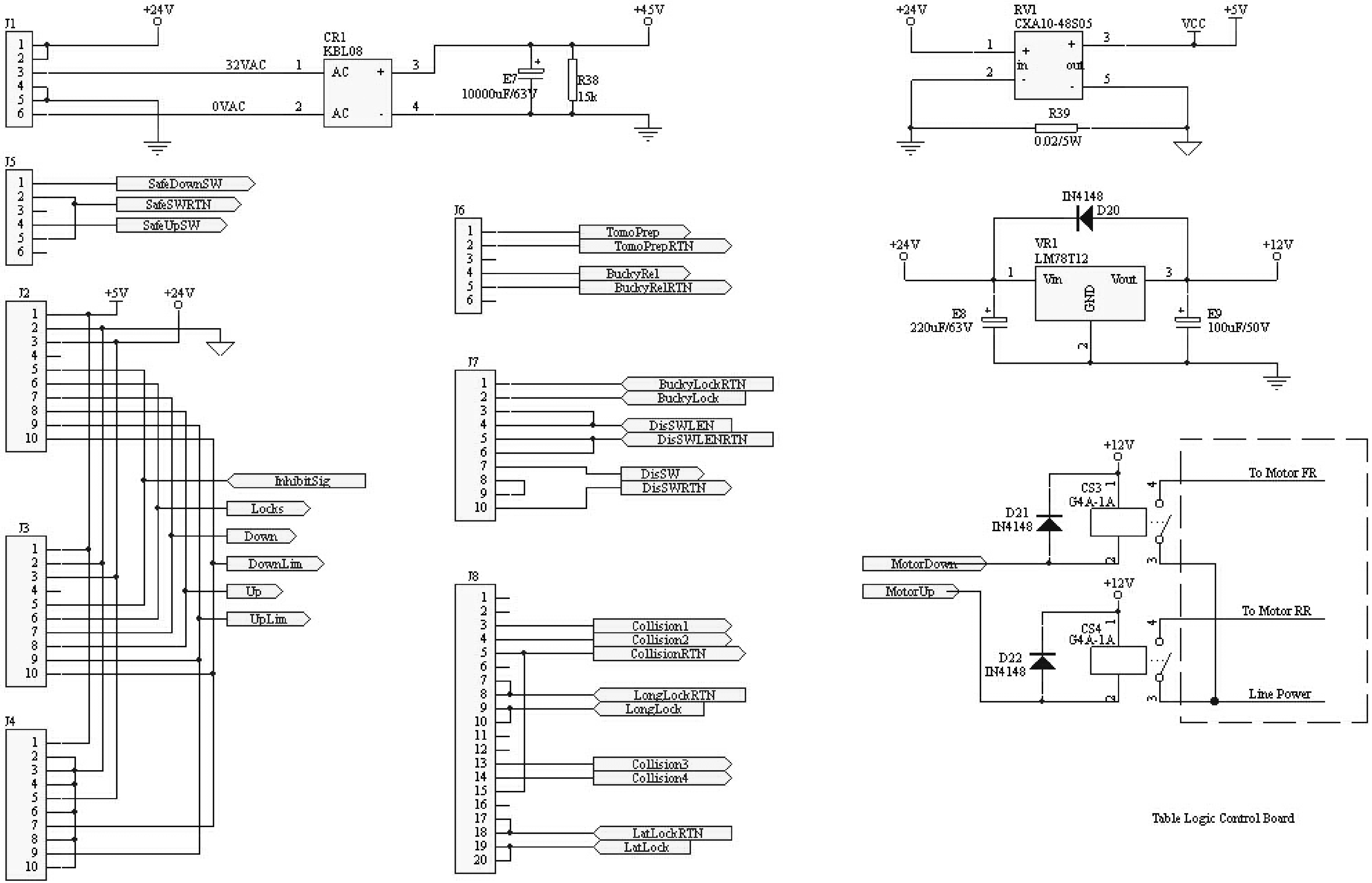

J1
+24V
CR1
KBL08
32VAC
0VAC
AC
+
-
+45V
E7
10000uF/63V
R38
15k
J5
SafeDownSW
SafeSWRTN
SafeUpSW
J6
TomoPrep
TomoPrepRTN
BuckyRel
BuckyRelRTN
J2
+5V
+24V
J3
J4
InhibitSig
Locks
Down
DownLim
Up
UpLim
J7
BuckyLockRTN
BuckyLock
DisSWLEN
DisSWLENRTN
DisSW
DisSWRTN
J8
Collision1
Collision2
CollisionRTN
LongLockRTN
LongLock
Collision3
Collision4
LatLockRTN
LatLock
RV1
CXA10-48S05
in
out
VCC
+5V
R39
0.02/5W
IN4148
D20
VR1
LM78T12
Vin
Vout
GND
+12V
E8
220uF/63V
E9
100uF/50V
CS3
G4A-1A
D21
IN4148
MotorDown
MotorUp
CS4
G4A-1A
D22
IN4148
To Motor FR
To Motor RR
Line Power
Table Logic Control Board

Table Logic Control Board (221-3010 for Rev0)

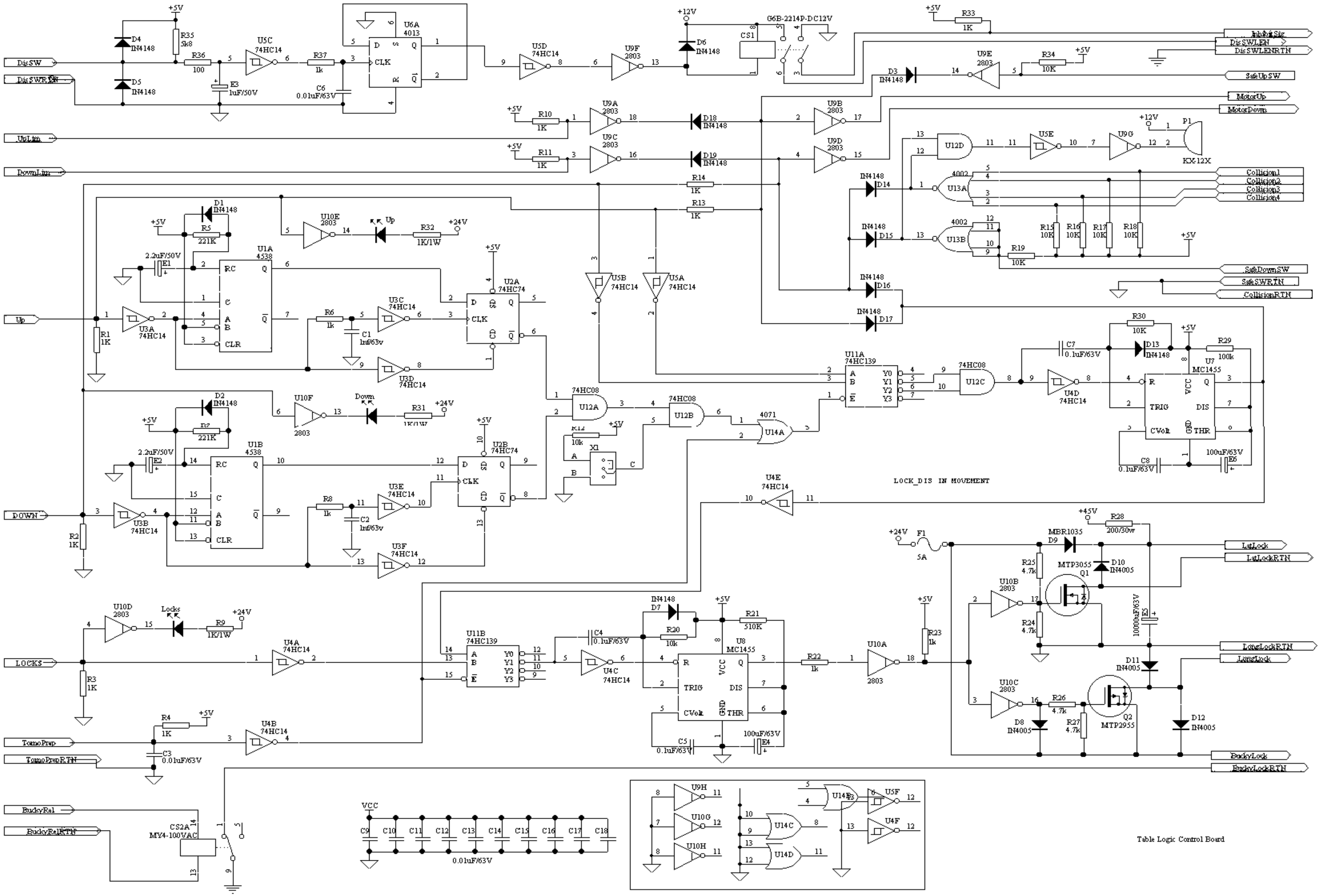
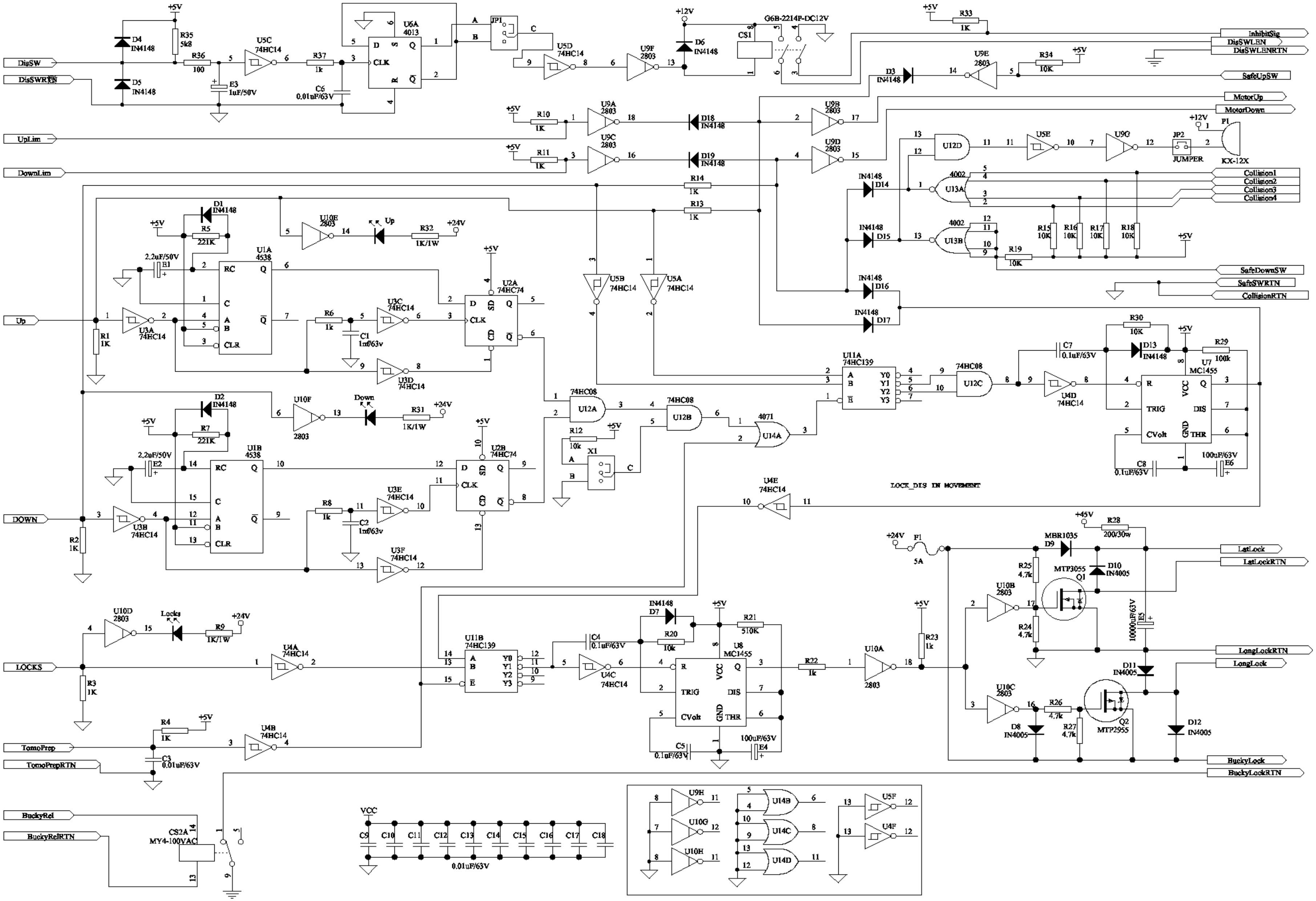
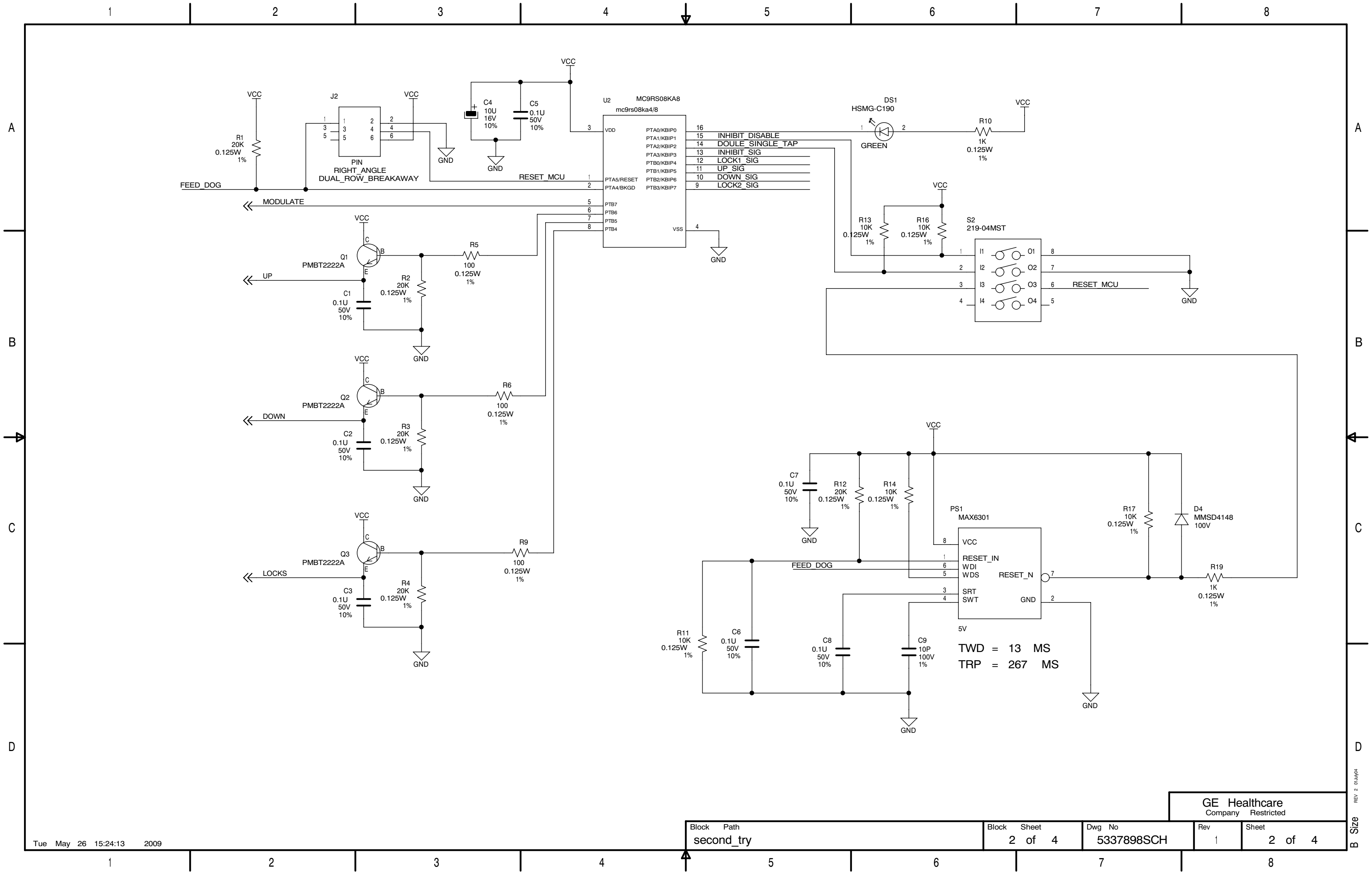
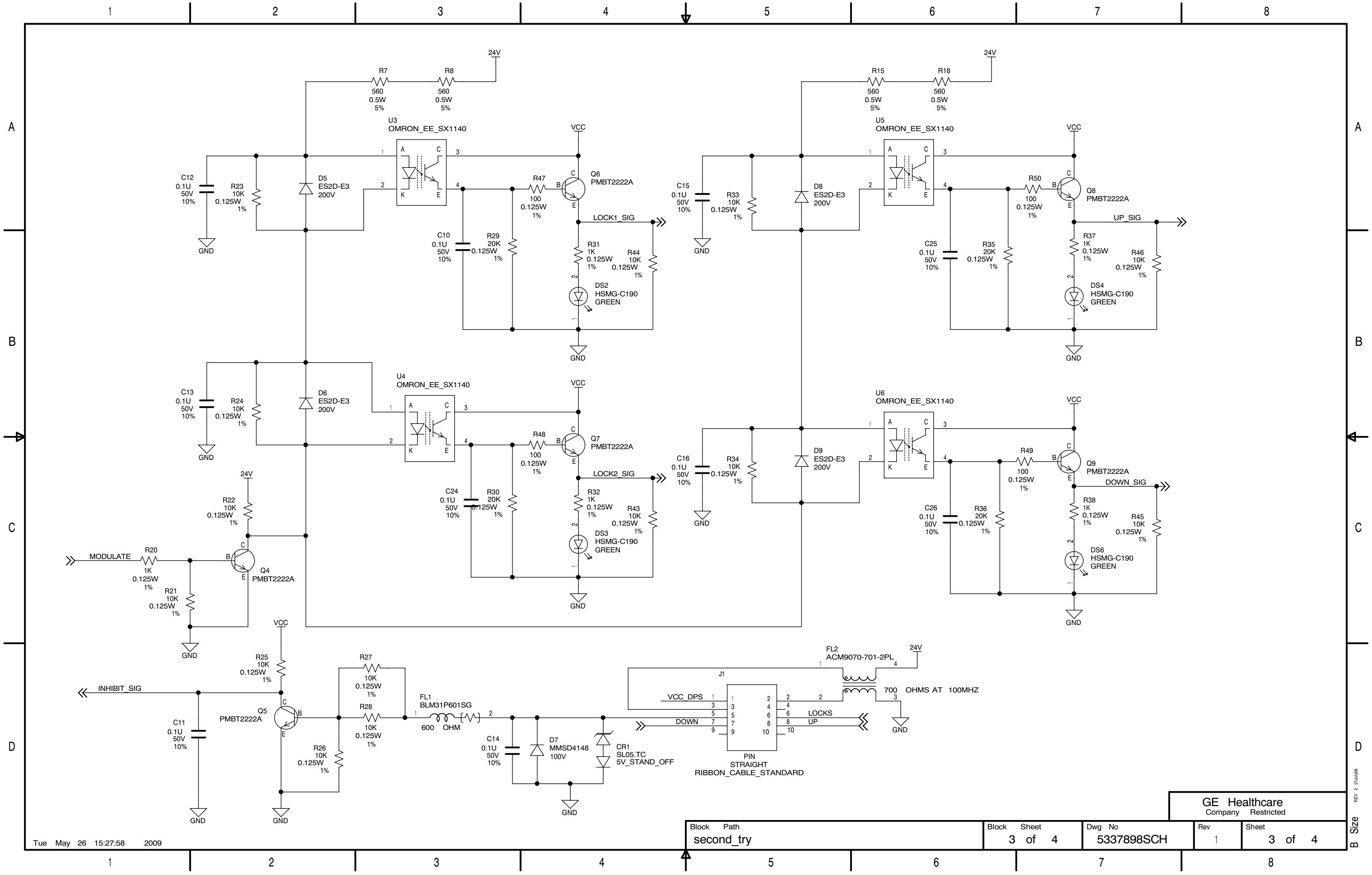

DisSW
DisSWRTN
UpLim
DownLim
Up
DOWN
LOCKS
TomoPrep
TomoPrepRTN
BuckyRel
BuckyRelRTN
InhibitSig
DisSWLEN
DisSWLENRTN
SafeUpSW
MotorUp
MotorDown
Collision1
Collision2
Collision3
Collision4
SafeDownSW
SafeSWRTN
CollisionRTN
LatLock
LatLockRTN
LongLockRTN
LongLock
BuckyLock
BuckyLockRTN
U6A 4013
U5C 74HC14
U5D 74HC14
U9F 2803
G6B-2214P-DC12V
CS1
U9E 2803
U9A 2803
U9B 2803
U9C 2803
U9D 2803
U12D
U5E
U9G
P1 KX-12X
U13A 4002
U13B 4002
U10E 2803
U1A 4538
U2A 74HC74
U3A 74HC14
U3C 74HC14
U3D 74HC14
U5B 74HC14
U5A 74HC14
U11A 74HC139
U12C 74HC08
U4D 74HC14
U7 MC1455
U10F 2803
U1B 4538
U2B 74HC74
U3B 74HC14
U3E 74HC14
U3F 74HC14
U12A 74HC08
U12B 74HC08
U14A 4071
X1
U4E 74HC14
LOCK_DIS IN MOVEMENT
U10D 2803
U4A 74HC14
U4B 74HC14
U11B 74HC139
U4C 74HC14
U8 MC1455
U10A 2803
U10B 2803
U10C 2803
Q1 MTP3055
Q2 MTP2955
MBR1035 D9
F1 5A
CS2A MY4-100VAC
U9H
U10G
U10H
U14C
U14D
U14B
U5F
U4F
VCC
C9 C10 C11 C12 C13 C14 C15 C16 C17 C18
0.01uF/63V
+5V
+12V
+24V
+45V
Table Logic Control Board

Table Logic Control Board (221-3010 for Rev1 & Rev2)


DisSW
DisSWRTN
UpLim
DownLim
Up
DOWN
LOCKS
TomoPrep
TomoPrepRTN
BuckyRel
BuckyRelRTN
InhibitSig
DisSWLBN
DisSWLBNRTN
SafeUpSW
MotorUp
MotorDown
Collision1
Collision2
Collision3
Collision4
SafeDownSW
SafeSWRTN
CollisionRTN
LatLock
LatLockRTN
LongLockRTN
LongLock
BuckyLock
BuckyLockRTN
U6A 4013
JP1
G6B-2214P-DC12V
CS1
U5C 74HC14
U5D 74HC14
U9F 2803
U9E 2803
U9A 2803
U9B 2803
U9C 2803
U9D 2803
U12D
U5E
U9G
JP2 JUMPER
P1 KX-12X
U13A 4002
U13B 4002
U1A 4538
U1B 4538
U2A 74HC74
U2B 74HC74
U10E 2803
U10F 2803
U3A 74HC14
U3B 74HC14
U3C 74HC14
U3D 74HC14
U3E 74HC14
U3F 74HC14
U5A 74HC14
U5B 74HC14
U12A 74HC08
U12B 74HC08
U12C 74HC08
U14A 4071
U11A 74HC139
U11B 74HC139
U4C 74HC14
U4D 74HC14
U4E 74HC14
U7 MC1455
U8 MC1455
U10A 2803
U10B 2803
U10C 2803
U10D 2803
U4A 74HC14
U4B 74HC14
X1
MBR1035 D9
MTP3055 Q1
Q2 MTP2955
F1 5A
CS2A MY4-100VAC
LOCK_DIS IN MOVEMENT
Up
Down
Locks
+5V
+12V
+24V
+45V
VCC
C9 C10 C11 C12 C13 C14 C15 C16 C17 C18
0.01uF/63V
U9H
U10G
U10H
U14B
U14C
U14D
U5F
U4F

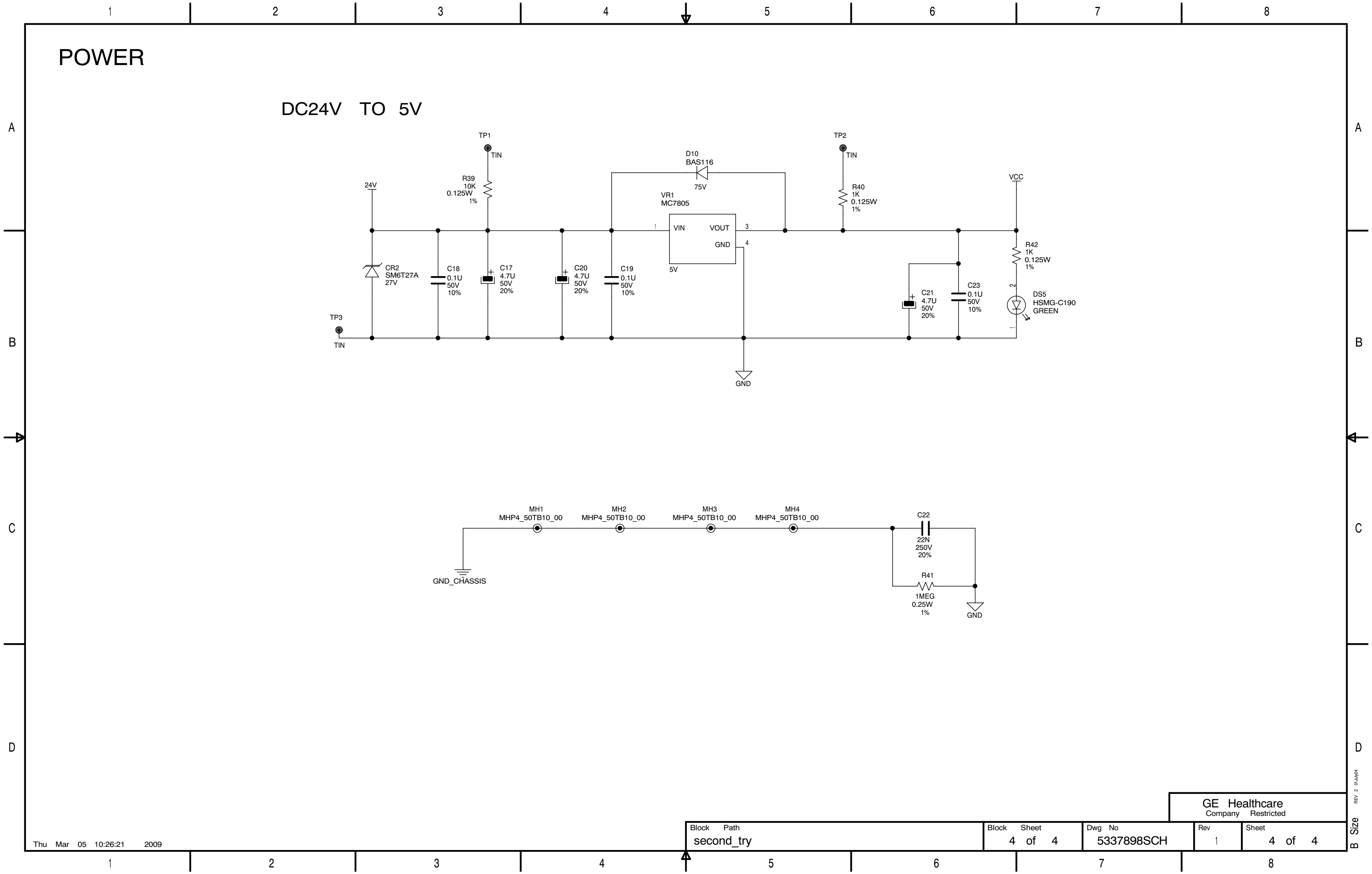
1-8 Pedal I/F Board


VCC
J2
R1
20K
0.125W
1%
FEED_DOG
PIN
RIGHT_ANGLE
DUAL_ROW_BREAKAWAY
GND
C4
10U
16V
10%
C5
0.1U
50V
10%
U2
MC9RS08KA8
mc9rs08ka4/8
VDD
PTA5/RESET
PTA4/BKGD
PTB7
PTB6
PTB5
PTB4
VSS
PTA0/KBIP0
PTA1/KBIP1
PTA2/KBIP2
PTA3/KBIP3
PTB0/KBIP4
PTB1/KBIP5
PTB2/KBIP6
PTB3/KBIP7
RESET_MCU
INHIBIT_DISABLE
DOULE_SINGLE_TAP
INHIBIT_SIG
LOCK1_SIG
UP_SIG
DOWN_SIG
LOCK2_SIG
MODULATE
DS1
HSMG-C190
GREEN
R10
1K
0.125W
1%
R13
10K
0.125W
1%
R16
10K
0.125W
1%
S2
219-04MST
I1
I2
I3
I4
O1
O2
O3
O4
Q1
PMBT2222A
UP
R5
100
0.125W
1%
R2
20K
0.125W
1%
C1
0.1U
50V
10%
Q2
PMBT2222A
DOWN
R6
100
0.125W
1%
R3
20K
0.125W
1%
C2
0.1U
50V
10%
Q3
PMBT2222A
LOCKS
R9
100
0.125W
1%
R4
20K
0.125W
1%
C3
0.1U
50V
10%
C7
0.1U
50V
10%
R12
20K
0.125W
1%
R14
10K
0.125W
1%
PS1
MAX6301
VCC
RESET_IN
WDI
WDS
RESET_N
SRT
SWT
GND
5V
R17
10K
0.125W
1%
D4
MMSD4148
100V
R19
1K
0.125W
1%
R11
10K
0.125W
1%
C6
0.1U
50V
10%
C8
0.1U
50V
10%
C9
10P
100V
1%
TWD = 13 MS
TRP = 267 MS
GE Healthcare
Company Restricted
Tue May 26 15:24:13 2009
Block Path
second_try
Block Sheet
2 of 4
Dwg No
5337898SCH
Rev
1
Sheet
2 of 4
B Size
REV 2 01July04


1
2
3
4
5
6
7
8
A
B
C
D
24V
R7 560 0.5W 5%
R8 560 0.5W 5%
U3 OMRON_EE_SX1140
VCC
C12 0.1U 50V 10%
R23 10K 0.125W 1%
D5 ES2D-E3 200V
R47 100 0.125W 1%
Q6 PMBT2222A
LOCK1_SIG
C10 0.1U 50V 10%
R29 20K 0.125W 1%
R31 1K 0.125W 1%
R44 10K 0.125W 1%
DS2 HSMG-C190 GREEN
GND
R15 560 0.5W 5%
R18 560 0.5W 5%
U5 OMRON_EE_SX1140
C15 0.1U 50V 10%
R33 10K 0.125W 1%
D8 ES2D-E3 200V
R50 100 0.125W 1%
Q8 PMBT2222A
UP_SIG
C25 0.1U 50V 10%
R35 20K 0.125W 1%
R37 1K 0.125W 1%
R46 10K 0.125W 1%
DS4 HSMG-C190 GREEN
U4 OMRON_EE_SX1140
C13 0.1U 50V 10%
R24 10K 0.125W 1%
D6 ES2D-E3 200V
R48 100 0.125W 1%
Q7 PMBT2222A
LOCK2_SIG
C24 0.1U 50V 10%
R30 20K 0.125W 1%
R32 1K 0.125W 1%
R43 10K 0.125W 1%
DS3 HSMG-C190 GREEN
U6 OMRON_EE_SX1140
C16 0.1U 50V 10%
R34 10K 0.125W 1%
D9 ES2D-E3 200V
R49 100 0.125W 1%
Q9 PMBT2222A
DOWN_SIG
C26 0.1U 50V 10%
R36 20K 0.125W 1%
R38 1K 0.125W 1%
R45 10K 0.125W 1%
DS6 HSMG-C190 GREEN
R22 10K 0.125W 1%
MODULATE
R20 1K 0.125W 1%
R21 10K 0.125W 1%
Q4 PMBT2222A
R25 10K 0.125W 1%
INHIBIT_SIG
C11 0.1U 50V 10%
Q5 PMBT2222A
R27 10K 0.125W 1%
R28 10K 0.125W 1%
R26 10K 0.125W 1%
FL1 BLM31P601SG
600 OHM
C14 0.1U 50V 10%
D7 MMSD4148 100V
CR1 SL05.TC 5V_STAND_OFF
FL2 ACM9070-701-2PL
700 OHMS AT 100MHZ
J1
VCC_DPS
DOWN
LOCKS
UP
PIN STRAIGHT RIBBON_CABLE_STANDARD
GE Healthcare
Company Restricted
Block Path
second_try
Block Sheet
3 of 4
Dwg No
5337898SCH
Rev
1
Sheet
3 of 4
B Size
Tue May 26 15:27:58 2009

POWER

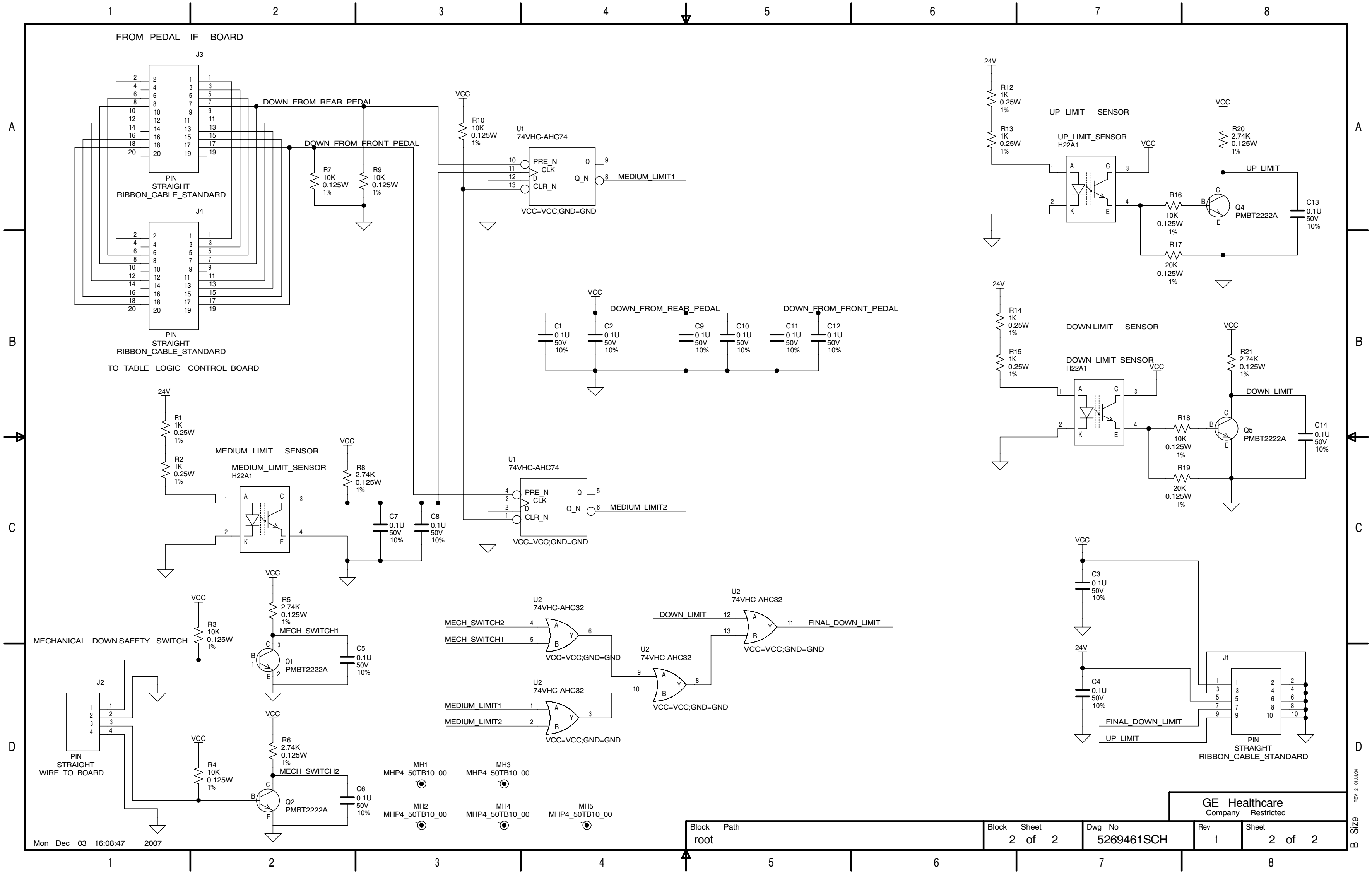
DC24V TO 5V


1
2
3
4
5
6
7
8
A
B
C
D
TP1
TIN
R39
10K
0.125W
1%
24V
CR2
SM6T27A
27V
C18
0.1U
50V
10%
C17
4.7U
50V
20%
C20
4.7U
50V
20%
C19
0.1U
50V
10%
TP3
TIN
D10
BAS116
75V
VR1
MC7805
VIN
VOUT
GND
5V
GND
TP2
TIN
R40
1K
0.125W
1%
VCC
R42
1K
0.125W
1%
C21
4.7U
50V
20%
C23
0.1U
50V
10%
DS5
HSMG-C190
GREEN
MH1
MHP4_50TB10_00
MH2
MHP4_50TB10_00
MH3
MHP4_50TB10_00
MH4
MHP4_50TB10_00
GND_CHASSIS
C22
22N
250V
20%
R41
1MEG
0.25W
1%
GND
REV 2 01July04
B Size

Thu Mar 05 10:26:21 2009

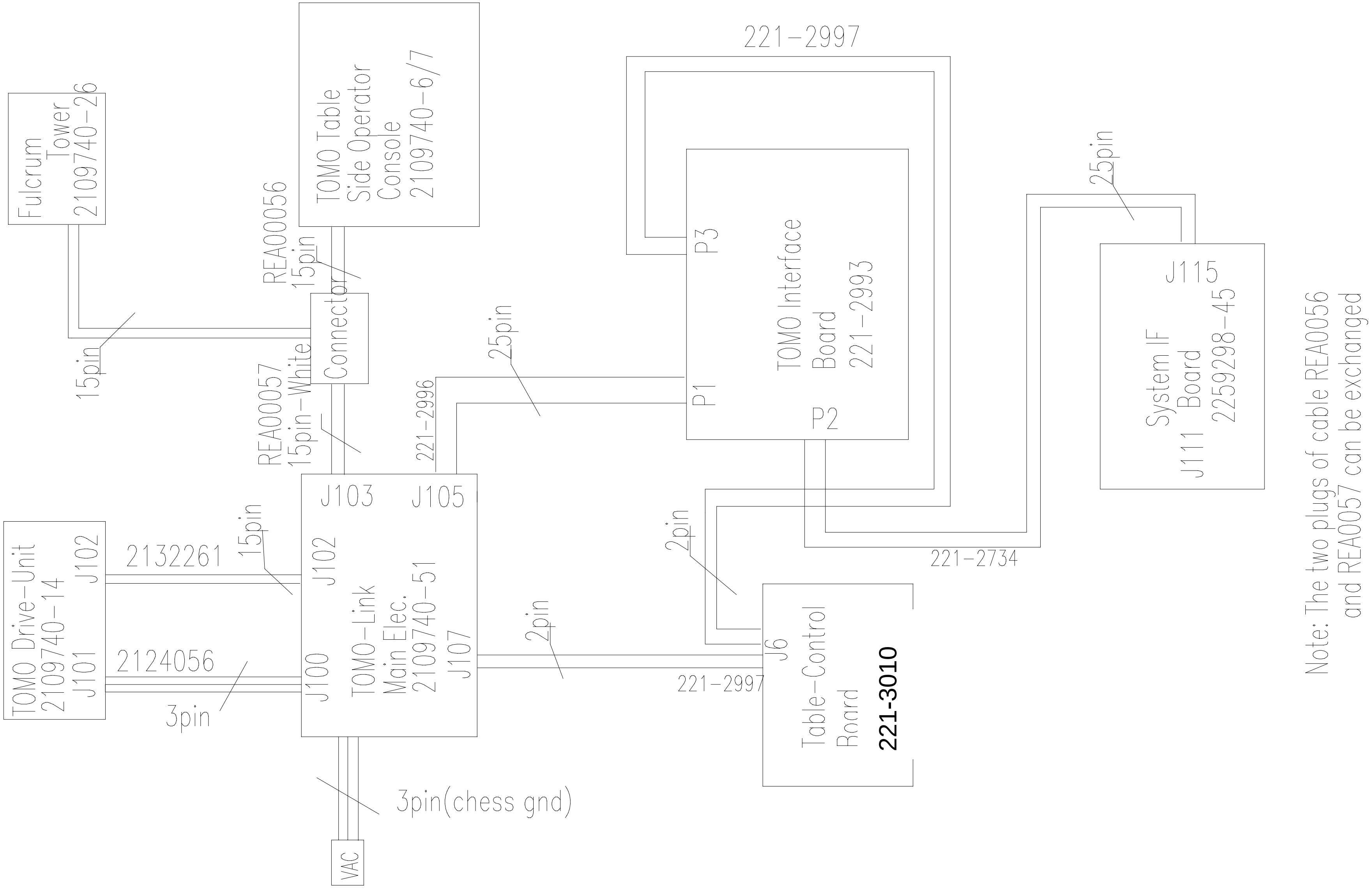
GE Healthcare
Company Restricted

Block Path	Block Sheet	Dwg No	Rev	Sheet
second_try	4 of 4	5337898SCH	1	4 of 4

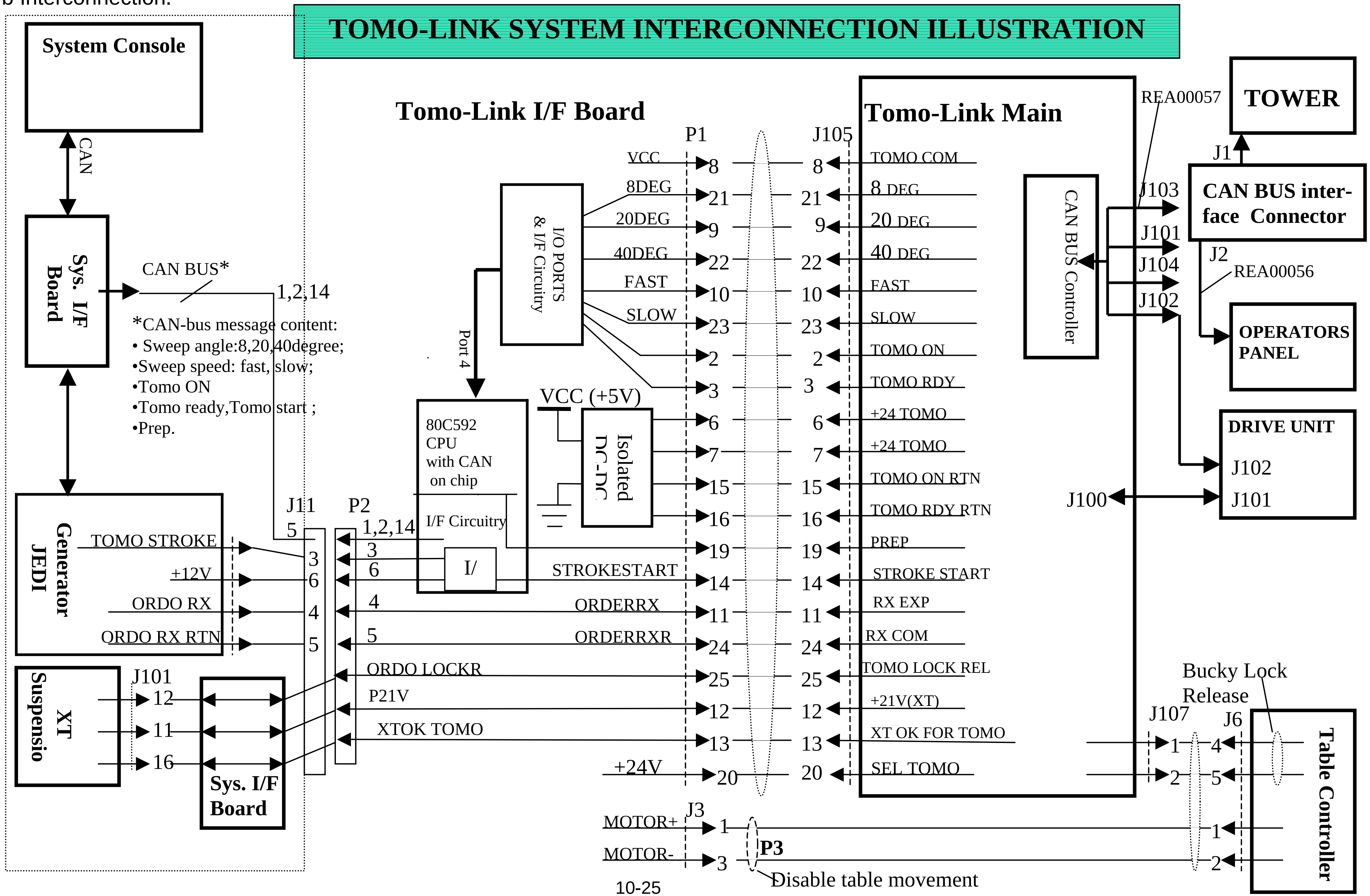

FROM PEDAL IF BOARD
J3
PIN
STRAIGHT
RIBBON_CABLE_STANDARD
J4
TO TABLE LOGIC CONTROL BOARD
DOWN_FROM_REAR_PEDAL
DOWN_FROM_FRONT_PEDAL
VCC
R10 10K 0.125W 1%
R7 10K 0.125W 1%
R9 10K 0.125W 1%
U1 74VHC-AHC74
PRE_N
CLK
D
CLR_N
Q
Q_N
MEDIUM_LIMIT1
VCC=VCC;GND=GND
C1 0.1U 50V 10%
C2 0.1U 50V 10%
C9 0.1U 50V 10%
C10 0.1U 50V 10%
C11 0.1U 50V 10%
C12 0.1U 50V 10%
24V
R1 1K 0.25W 1%
R2 1K 0.25W 1%
MEDIUM LIMIT SENSOR
MEDIUM_LIMIT_SENSOR H22A1
R8 2.74K 0.125W 1%
C7 0.1U 50V 10%
C8 0.1U 50V 10%
MEDIUM_LIMIT2
R12 1K 0.25W 1%
R13 1K 0.25W 1%
UP LIMIT SENSOR
UP_LIMIT_SENSOR H22A1
R20 2.74K 0.125W 1%
UP_LIMIT
R16 10K 0.125W 1%
Q4 PMBT2222A
C13 0.1U 50V 10%
R17 20K 0.125W 1%
R14 1K 0.25W 1%
R15 1K 0.25W 1%
DOWN LIMIT SENSOR
DOWN_LIMIT_SENSOR H22A1
R21 2.74K 0.125W 1%
DOWN_LIMIT
R18 10K 0.125W 1%
Q5 PMBT2222A
C14 0.1U 50V 10%
R19 20K 0.125W 1%
MECHANICAL DOWN SAFETY SWITCH
R3 10K 0.125W 1%
R5 2.74K 0.125W 1%
MECH_SWITCH1
Q1 PMBT2222A
C5 0.1U 50V 10%
J2
PIN
STRAIGHT
WIRE_TO_BOARD
R4 10K 0.125W 1%
R6 2.74K 0.125W 1%
MECH_SWITCH2
Q2 PMBT2222A
C6 0.1U 50V 10%
U2 74VHC-AHC32
MECH_SWITCH2
MECH_SWITCH1
MEDIUM_LIMIT1
MEDIUM_LIMIT2
DOWN_LIMIT
FINAL_DOWN_LIMIT
MH1 MHP4_50TB10_00
MH2 MHP4_50TB10_00
MH3 MHP4_50TB10_00
MH4 MHP4_50TB10_00
MH5 MHP4_50TB10_00
C3 0.1U 50V 10%
C4 0.1U 50V 10%
J1
PIN
STRAIGHT
RIBBON_CABLE_STANDARD
FINAL_DOWN_LIMIT
UP_LIMIT
GE Healthcare
Company Restricted
Block Path
root
Block Sheet
2 of 2
Dwg No
5269461SCH
Rev
1
Sheet
2 of 2
B Size
REV 2 01July04
Mon Dec 03 16:08:47 2007
1 2 3 4 5 6 7 8
A B C D

1-9 **Tomo-link System Schematics**

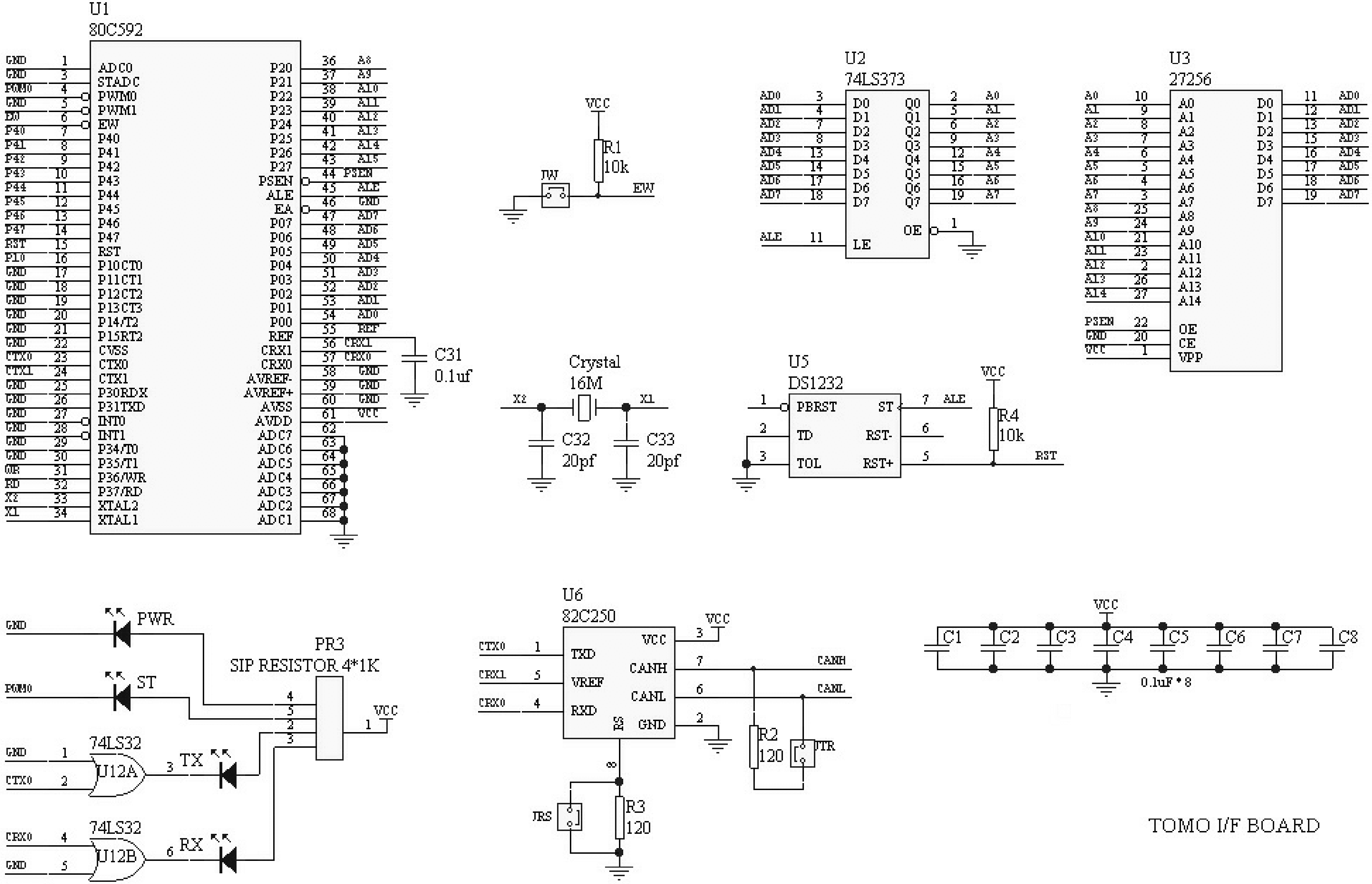
a Cables Illustration


Fulcrum Tower 2109740-26
TOMO Table Side Operator Console 2109740-6/7
REA00056 15pin
Connector
15pin
REA00057 15pin-White
221-2997
TOMO Interface Board 221-2993
P3
P1
P2
25pin
221-2996
25pin
J115
System IF Board 2259298-45
J111
221-2734
Note: The two plugs of cable REA0056 and REA0057 can be exchanged
TOMO Drive-Unit 2109740-14
J102
J101
2132261
15pin
2124056
3pin
J103
J105
J102
J100
TOMO-Link Main Elec. 2109740-51
J107
2pin
2pin
221-2997
J6
Table-Control Board
221-3010
3pin(chess gnd)
VAC

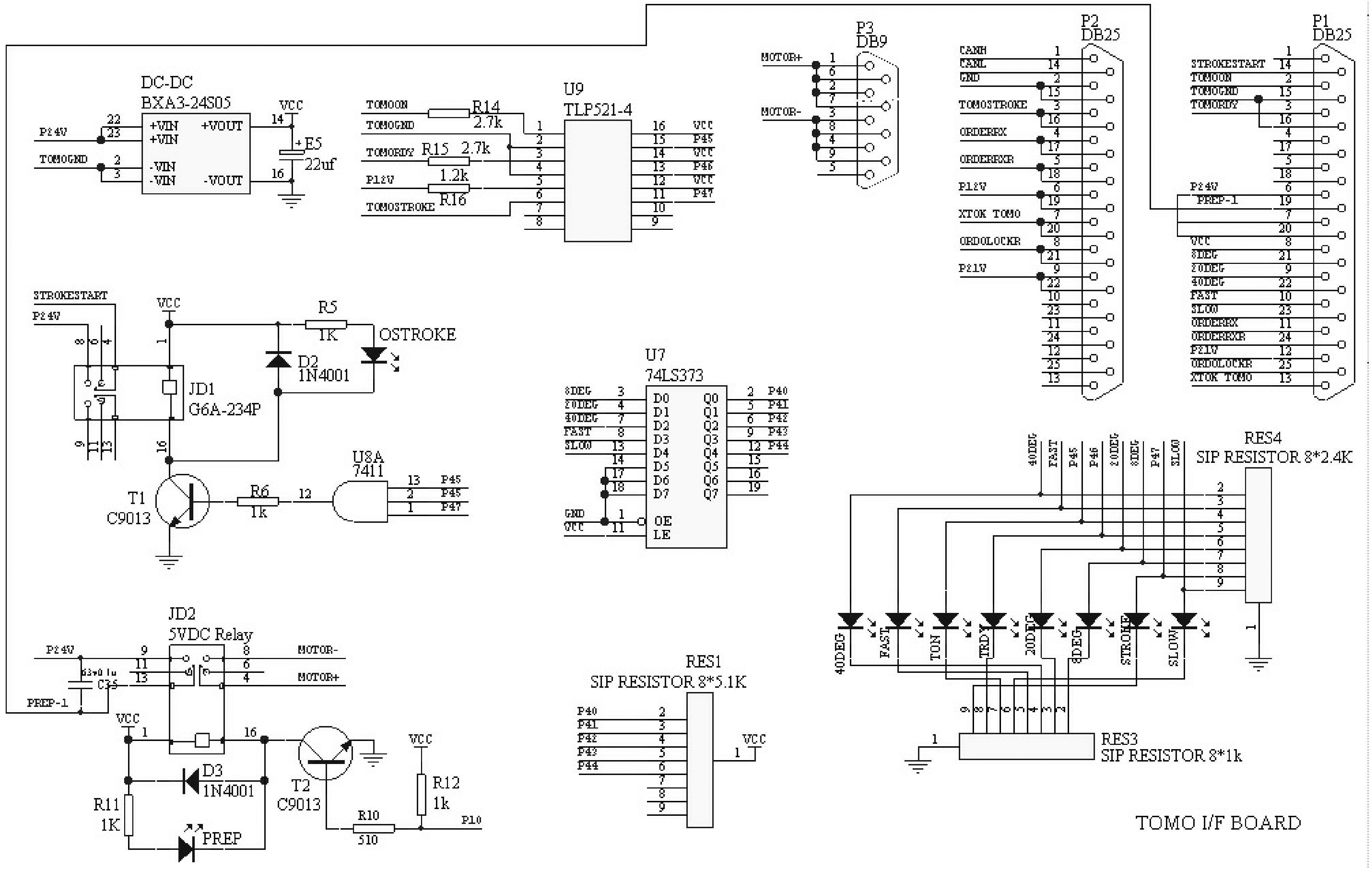
b Interconnection.


TOMO-LINK SYSTEM INTERCONNECTION ILLUSTRATION
System Console
CAN
Sys. I/F Board
CAN BUS*
1,2,14
*CAN-bus message content:
• Sweep angle:8,20,40degree;
•Sweep speed: fast, slow;
•Tomo ON
•Tomo ready,Tomo start ;
•Prep.
Generator JEDI
TOMO STROKE
+12V
ORDO RX
ORDO RX RTN
XT Suspensio
J101
12
11
16
Sys. I/F Board
J11
5
3
6
4
5
P2
1,2,14
3
6
4
5
ORDO LOCKR
P21V
XTOK TOMO
Tomo-Link I/F Board
I/O PORTS & I/F Circuitry
Port 4
80C592 CPU with CAN on chip
I/F Circuitry
I/
VCC (+5V)
Isolated DC-DC
STROKESTART
ORDERRX
ORDERRXR
+24V
P1
VCC
8DEG
20DEG
40DEG
FAST
SLOW
8
21
9
22
10
23
2
3
6
7
15
16
19
14
11
24
25
12
13
20
J105
8
21
9
22
10
23
2
3
6
7
15
16
19
14
11
24
25
12
13
20
Tomo-Link Main
TOMO COM
8 DEG
20 DEG
40 DEG
FAST
SLOW
TOMO ON
TOMO RDY
+24 TOMO
+24 TOMO
TOMO ON RTN
TOMO RDY RTN
PREP
STROKE START
RX EXP
RX COM
TOMO LOCK REL
+21V(XT)
XT OK FOR TOMO
SEL TOMO
CAN BUS Controller
J103
J101
J104
J102
J100
REA00057
TOWER
J1
CAN BUS inter-face Connector
J2
REA00056
OPERATORS PANEL
DRIVE UNIT
J102
J101
Bucky Lock Release
J107
J6
1
2
4
5
Table Controller
J3
MOTOR+
MOTOR-
1
3
P3
1
2
Disable table movement

1-10 **Tomo I/F Board (1)**


U1
80C592
R1
10k
VCC
JW
EW
U2
74LS373
U3
27256
Crystal
16M
X2
X1
C31
0.1uf
C32
20pf
C33
20pf
U5
DS1232
PBRST
TD
TOL
ST
RST-
RST+
R4
10k
RST
ALE
PWR
ST
PR3
SIP RESISTOR 4*1K
74LS32
U12A
U12B
TX
RX
U6
82C250
TXD
VREF
RXD
VCC
CANH
CANL
GND
R2
120
JTR
R3
120
JRS
C1
C2
C3
C4
C5
C6
C7
C8
0.1uF * 8
TOMO I/F BOARD

Tomo I/F Board (2)


DC-DC
BXA3-24S05
+VIN
+VIN
+VOUT
-VIN
-VIN
-VOUT
P24V
TOMOGND
VCC
E5
22uf
TOMOON
TOMOGND
TOMORDY
P12V
TOMOSTROKE
R14
2.7k
R15
2.7k
1.2k
R16
U9
TLP521-4
P45
P46
P47
MOTOR+
MOTOR-
P3
DB9
P2
DB25
CANH
CANL
GND
ORDERRX
ORDERRXR
XTOK TOMO
ORDOLOCKR
P21V
P1
DB25
STROKESTART
PREP-1
8DEG
20DEG
40DEG
FAST
SLOW
ORDERRX
ORDERRXR
P21V
ORDOLOCKR
XTOK TOMO
JD1
G6A-234P
R5
1K
OSTROKE
D2
1N4001
T1
C9013
R6
1k
U8A
7411
U7
74LS373
D0 D1 D2 D3 D4 D5 D6 D7
Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7
OE
LE
P40
P41
P42
P43
P44
RES4
SIP RESISTOR 8*2.4K
40DEG
FAST
TON
TRDY
20DEG
8DEG
STROKE
SLOW
RES3
SIP RESISTOR 8*1k
JD2
5VDC Relay
C35
R11
1K
D3
1N4001
PREP
T2
C9013
R10
510
R12
1k
P10
RES1
SIP RESISTOR 8*5.1K
TOMO I/F BOARD

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SECTION 2

JEDI GENERATOR ILLUSTRATIONS

2-1 JEDI 50PLUS R 1T CABLING

Illustration - Jedi 50Plus R 1T Cabling (1/2)

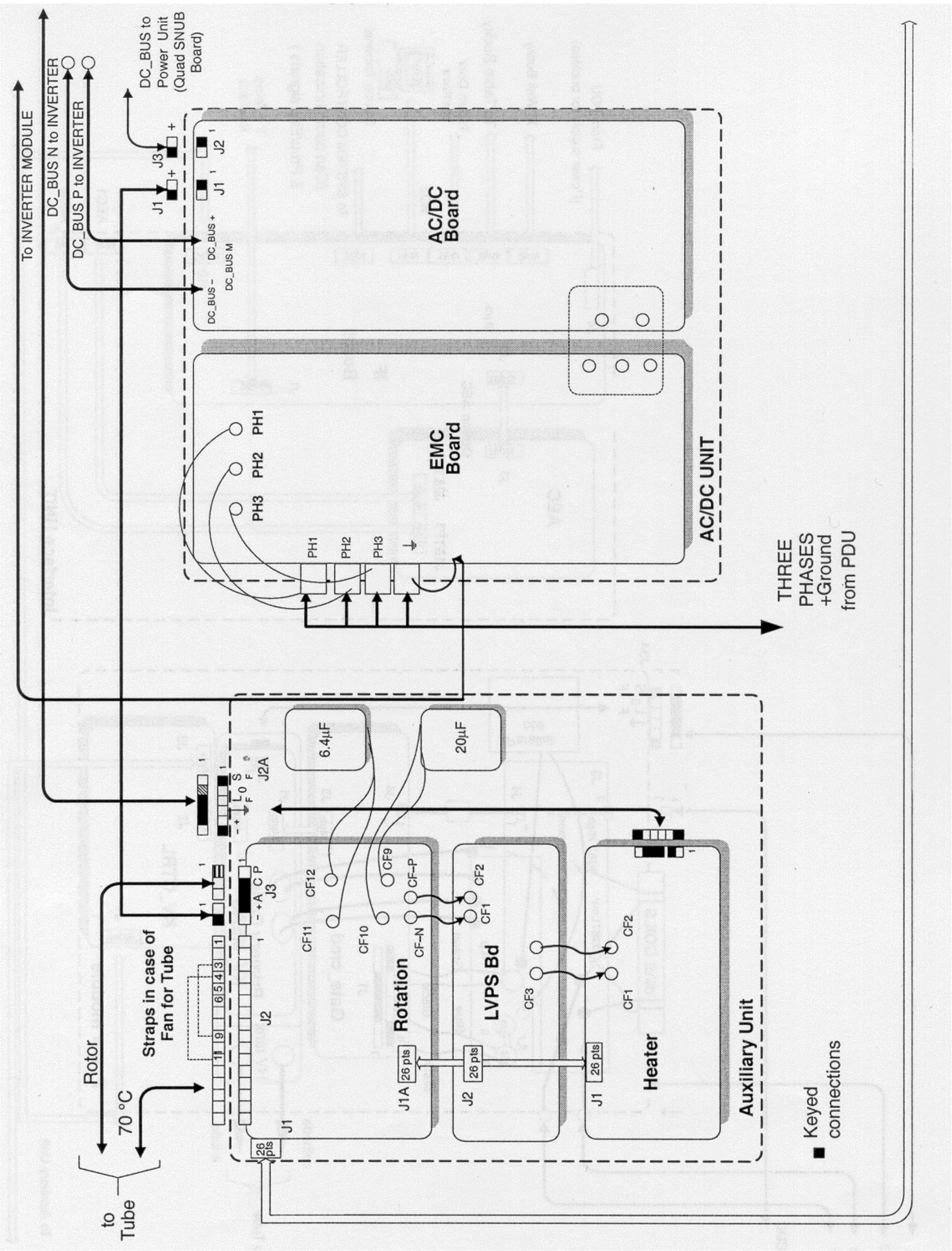
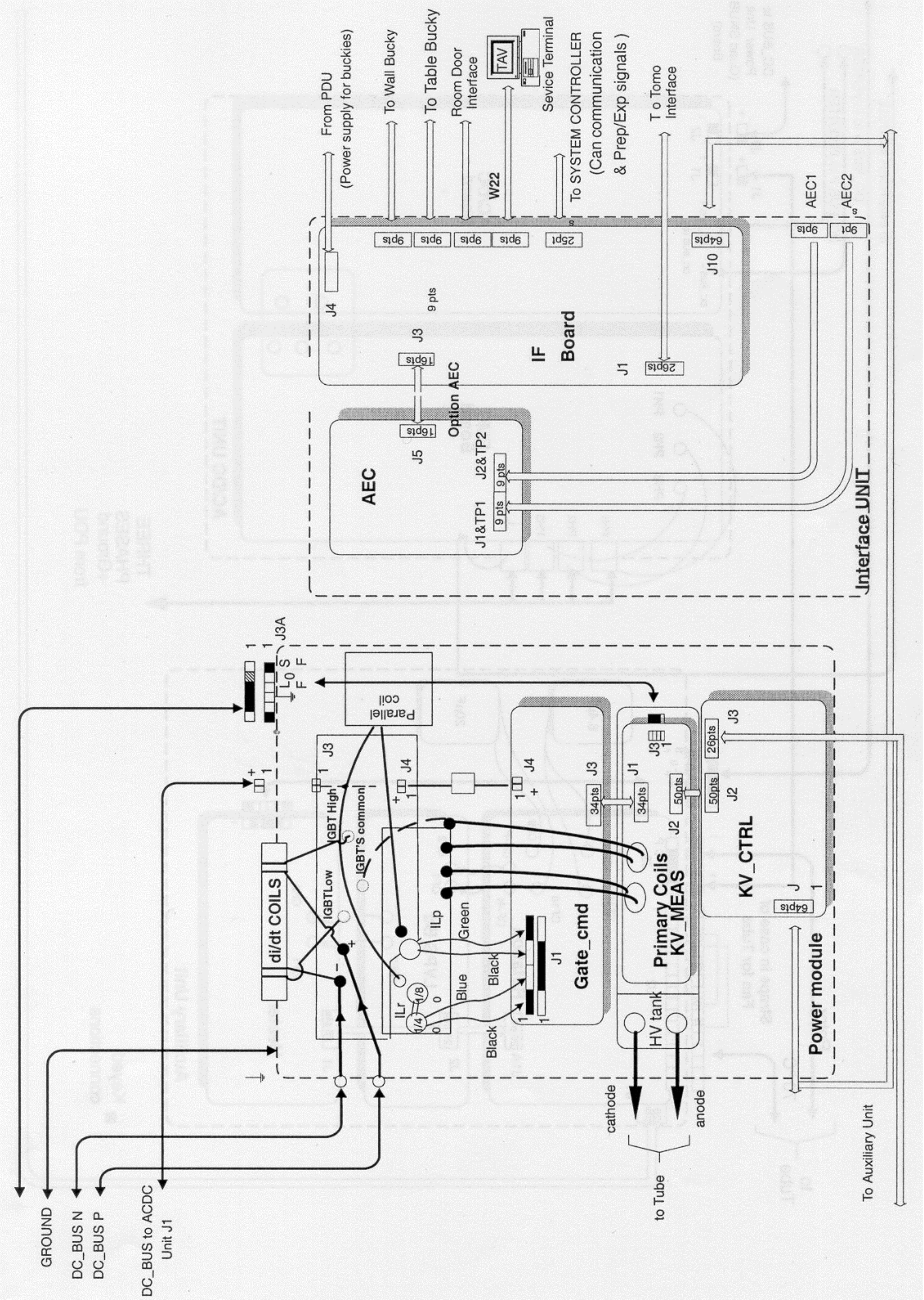
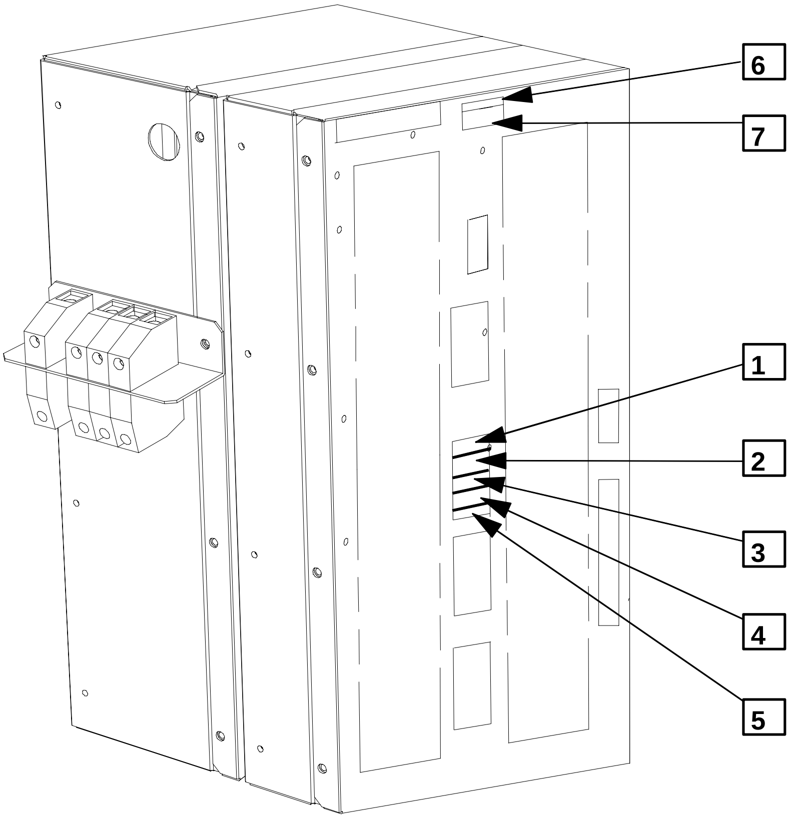

To INVERTER MODULE
DC_BUS N to INVERTER
DC_BUS P to INVERTER
DC_BUS to Power Unit (Quad SNUB Board)
J1
J3
J2
+
DC_BUS +
DC_BUS M
DC_BUS –
AC/DC Board
EMC Board
PH1
PH2
PH3
AC/DC UNIT
THREE PHASES +Ground from PDU
6.4µF
20µF
J2A
S
F
L
O
F
Rotor
Straps in case of Fan for Tube
70 °C
to Tube
J2
J3
- + A C P
CF12
CF11
CF10
CF9
CF-P
CF–N
CF2
CF1
CF3
Rotation
LVPS Bd
Heater
J1A
J1
26 pts
Auxiliary Unit
■ Keyed connections

Illustration - Jedi 50Plus R 1T Cabling (2/2)

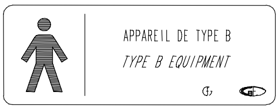

From PDU
(Power supply for buckies)
To Wall Bucky
To Table Bucky
Room Door Interface
TAV
Sevice Terminal
W22
To SYSTEM CONTROLLER
(Can communication
& Prep/Exp signals)
T o Tomo Interface
AEC1
AEC2
9pts
9pts
9pts
9pts
25pt
64pts
9pts
9pt
J4
9 pts
J3
16pts
J10
IF
Board
J1
26pts
Option AEC
16pts
J5
AEC
J2&TP2
9 pts
J1&TP1
9 pts
Interface UNIT
J3A
1
1
S
F
L0
S
F
Parallel coil
J3
1
J4
1
+
J4
1
+
di/dt COILS
IGBT High
IGBT'S common
IGBTLow
+
-
ILp
ILr
1/4
1/8
0
0
Blue
Green
Black
Black
J1
1
1
Gate_cmd
J3
34pts
J1
34pts
J3
1
J2
50pts
Primary Coils
KV_MEAS
HV tank
26pts
J3
50pts
J2
KV_CTRL
64pts
J
1
Power module
cathode
anode
to Tube
To Auxiliary Unit
GROUND
DC_BUS N
DC_BUS P
DC_BUS to ACDC
Unit J1

2-2 JEDI LABELING PLAN

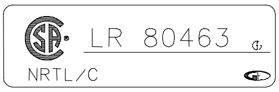
Illustration - Jedi 50 R 1T labeling plan



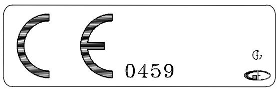
1


APPAREIL DE TYPE B
TYPE B EQUIPMENT

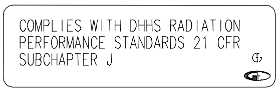
2


LR 80463
NRTL/C

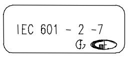
3


0459

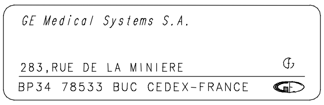
4


COMPLIES WITH DHHS RADIATION
PERFORMANCE STANDARDS 21 CFR
SUBCHAPTER J

5


IEC 601 - 2 -7

6


GE Medical Systems S.A.
283,RUE DE LA MINIERE
BP34 78533 BUC CEDEX-FRANCE

7

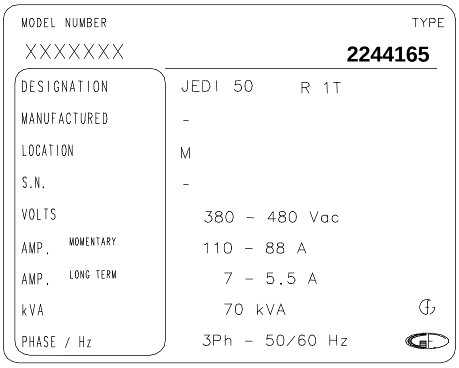

MODEL NUMBER XXXXXXX
TYPE **2244165**
DESIGNATION JEDI 50 R 1T
MANUFACTURED -
LOCATION M
S.N. -
VOLTS 380 - 480 Vac
AMP. MOMENTARY 110 - 88 A
AMP. LONG TERM 7 - 5.5 A
kVA 70 kVA
PHASE / Hz 3Ph - 50/60 Hz

Illustration - Jedi 80 R 1T labeling plan

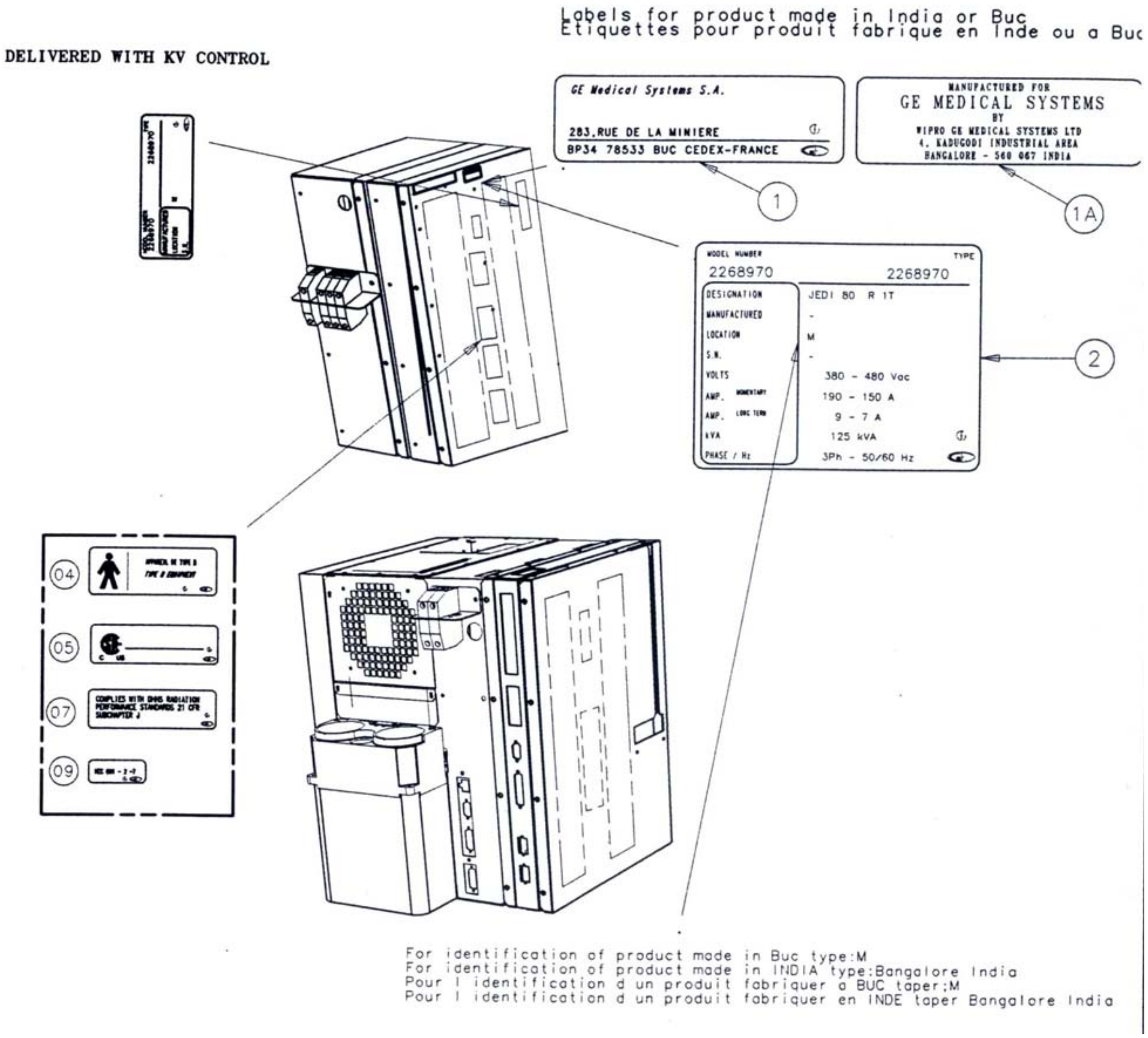

Labels for product made in India or Buc
Etiquettes pour produit fabrique en Inde ou a Buc
DELIVERED WITH KV CONTROL
GE Medical Systems S.A.
283, RUE DE LA MINIERE
BP34 78533 BUC CEDEX-FRANCE
MANUFACTURED FOR
GE MEDICAL SYSTEMS
BY
WIPRO GE MEDICAL SYSTEMS LTD
4, KADUGODI INDUSTRIAL AREA
BANGALORE - 560 067 INDIA
1
1A
MODEL NUMBER
2268970
TYPE
2268970
DESIGNATION
JEDI 80 R 1T
MANUFACTURED
-
LOCATION
M
S.N.
-
VOLTS
380 - 480 Vac
AMP. MOMENTARY
190 - 150 A
AMP. LONG TERM
9 - 7 A
kVA
125 kVA
PHASE / Hz
3Ph - 50/60 Hz
2
04
05
C US
07
COMPLIES WITH DHHS RADIATION PERFORMANCE STANDARDS 21 CFR SUBCHAPTER J
09
For identification of product made in Buc type:M
For identification of product made in INDIA type:Bangalore India
Pour l identification d un produit fabriquer a BUC taper:M
Pour l identification d un produit fabriquer en INDE taper Bangalore India

Illustration - I/F Board RAD V2 Electrical Schematics, Sheet 1

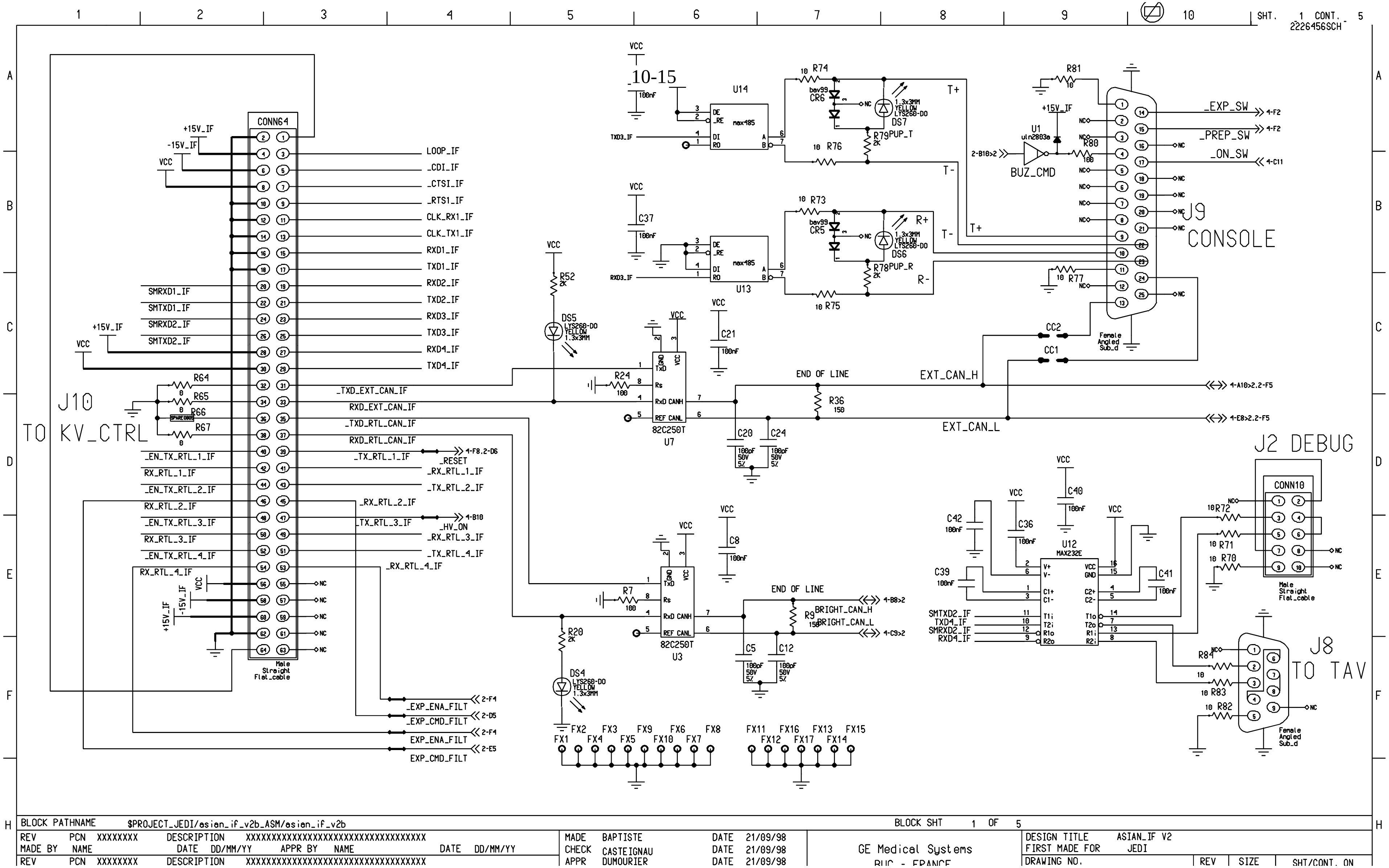

SHT. 1 CONT. 5
2226456SCH
10-15
VCC
100nF
U14
max485
DE
_RE
DI
RO
TXD3_IF
R74
bav99
CR6
1.3x3MM YELLOW LYS260-DD
DS7
R79 PUP_T
2K
R76
T+
T-
R81
+15V_IF
U1
uln2803a
R80
100
2-B10>2
BUZ_CMD
_EXP_SW
4-F2
_PREP_SW
_ON_SW
4-C11
J9
CONSOLE
Female Angled Sub_d
C37
R73
CR5
DS6
R78 PUP_R
R+
R-
U13
RXD3_IF
R77
R75
CC2
CC1
CONN64
+15V_IF
-15V_IF
VCC
LOOP_IF
_CDI_IF
_CTSI_IF
_RTS1_IF
CLK_RX1_IF
CLK_TX1_IF
RXD1_IF
TXD1_IF
RXD2_IF
TXD2_IF
RXD3_IF
TXD3_IF
RXD4_IF
TXD4_IF
SMRXD1_IF
SMTXD1_IF
SMRXD2_IF
SMTXD2_IF
R64
R65
R66
SPARE0805
R67
J10
TO KV_CTRL
_TXD_EXT_CAN_IF
RXD_EXT_CAN_IF
_TXD_RTL_CAN_IF
RXD_RTL_CAN_IF
_EN_TX_RTL_1_IF
RX_RTL_1_IF
_EN_TX_RTL_2_IF
RX_RTL_2_IF
_EN_TX_RTL_3_IF
RX_RTL_3_IF
_EN_TX_RTL_4_IF
RX_RTL_4_IF
_TX_RTL_1_IF
_RESET
4-F8,2-D6
_RX_RTL_1_IF
_TX_RTL_2_IF
_RX_RTL_2_IF
_TX_RTL_3_IF
_HV_ON
4-B10
_RX_RTL_3_IF
_TX_RTL_4_IF
_RX_RTL_4_IF
NC
Male Straight Flat_cable
_EXP_ENA_FILT
2-F4
_EXP_CMD_FILT
2-D5
EXP_ENA_FILT
2-F4
2-E5
EXP_CMD_FILT
R52
2K
DS5
LYS260-DD YELLOW 1.3x3MM
R24
100
82C250T
U7
TxD
Rs
RxD CANH
REF CANL
GND
VCC
C21
100nF
END OF LINE
EXT_CAN_H
R36
150
4-A10>2,2-F5
4-E8>2,2-F5
EXT_CAN_L
C20
C24
100pF 50V 5%
J2 DEBUG
CONN10
R72
R71
R70
Male Straight Flat_cable
C40
C42
C36
U12
MAX232E
C39
C41
V+
V-
C1+
C1-
C2+
C2-
T1i
T2i
R1o
R2o
T1o
T2o
R1i
R2i
SMTXD2_IF
TXD4_IF
SMRXD2_IF
RXD4_IF
C8
R7
U3
END OF LINE
4-B8>2
BRIGHT_CAN_H
R9
150
BRIGHT_CAN_L
4-C9>2
C5
C12
R20
2K
DS4
LYS260-DD YELLOW 1.3x3MM
FX1 FX2 FX3 FX4 FX5 FX6 FX7 FX8 FX9 FX10
FX11 FX12 FX13 FX14 FX15 FX16 FX17
R84
R83
R82
J8
TO TAV
Female Angled Sub_d
BLOCK PATHNAME $PROJECT_JEDI/asian_if_v2b_ASM/asian_if_v2b
BLOCK SHT 1 OF 5
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BAPTISTE DATE 21/09/98
CHECK CASTEIGNAU DATE 21/09/98
APPR DUMOURIER DATE 21/09/98
GE Medical Systems
DESIGN TITLE ASIAN_IF V2
FIRST MADE FOR JEDI
DRAWING NO.
REV
SIZE
SHT/CONT. ON

Illustration - I/F Board RAD V2 Electrical Schematics, Sheet 2

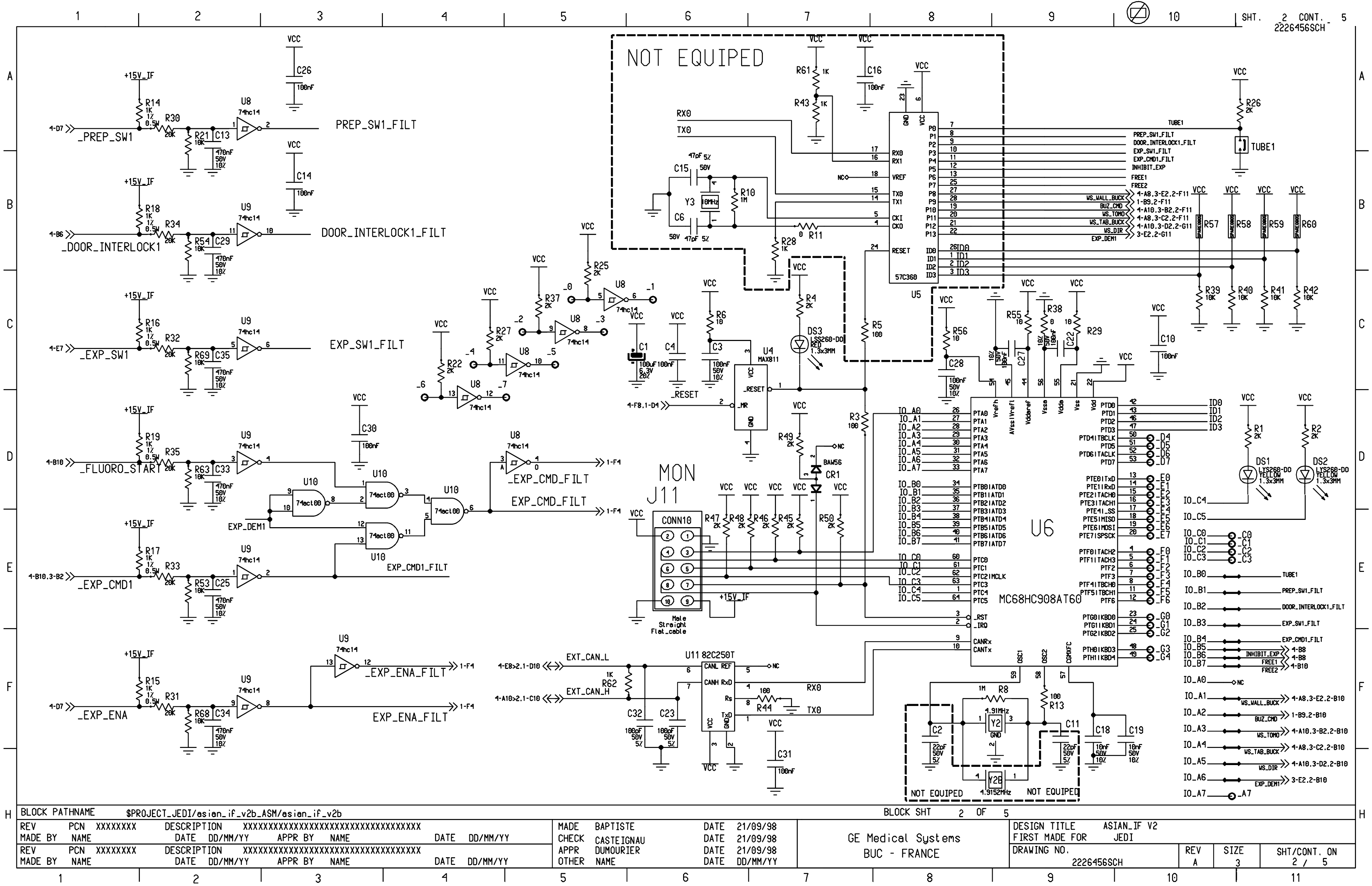

SHT. 2 CONT. 5
2226456SCH
NOT EQUIPED
+15V_IF
_PREP_SW1
PREP_SW1_FILT
_DOOR_INTERLOCK1
DOOR_INTERLOCK1_FILT
_EXP_SW1
EXP_SW1_FILT
_FLUORO_START
_EXP_CMD_FILT
EXP_CMD_FILT
EXP_DEM1
_EXP_CMD1
EXP_CMD1_FILT
_EXP_ENA
_EXP_ENA_FILT
EXP_ENA_FILT
U8 74hc14
U9 74hc14
U10 74act00
VCC
RX0
TX0
U5 57C360
Y3 10MHz
U4 MAX811
_RESET
MON
J11
CONN10
Male Straight Flat_cable
EXT_CAN_L
EXT_CAN_H
U11 82C250T
U6
MC68HC908AT60
TUBE1
DS1 YELLOW
DS2 YELLOW
DS3 RED
CR1 BAW56
Y2 4.91MHz
Y2B 4.9152MHz
NOT EQUIPED
BLOCK PATHNAME $PROJECT_JEDI/asian_if_v2b_ASM/asian_if_v2b
BLOCK SHT 2 OF 5
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE BAPTISTE DATE 21/09/98
CHECK CASTEIGNAU DATE 21/09/98
APPR DUMOURIER DATE 21/09/98
OTHER NAME DATE DD/MM/YY
GE Medical Systems
BUC - FRANCE
DESIGN TITLE ASIAN_IF V2
FIRST MADE FOR JEDI
DRAWING NO. 2226456SCH
REV A
SIZE 3
SHT/CONT. ON 2 / 5

Illustration - I/F Board RAD V2 Electrical Schematics, Sheet 3

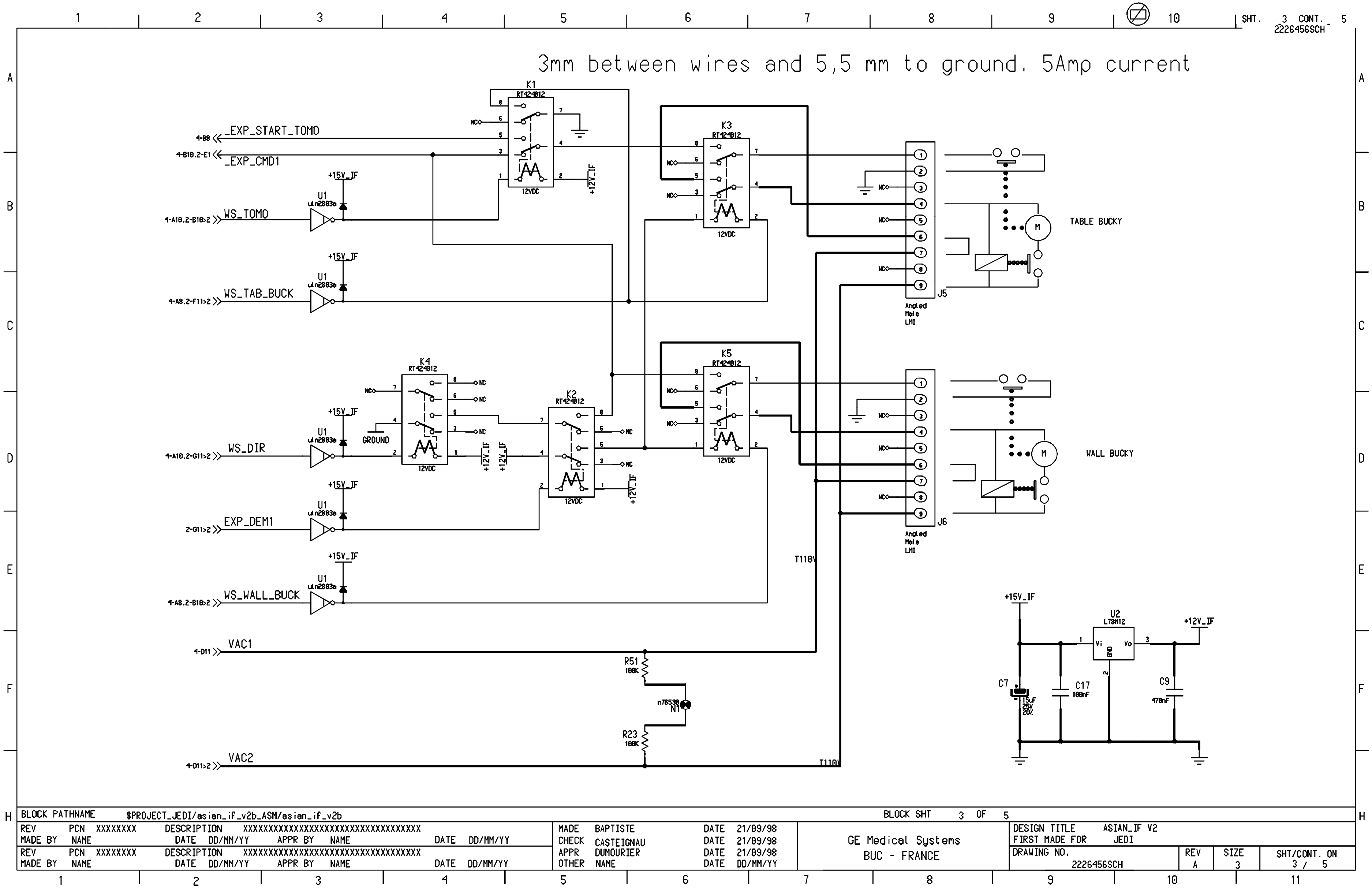

SHT. 3 CONT. 5
2226456SCH
3mm between wires and 5,5 mm to ground, 5Amp current
K1
RT424012
12VDC
K2
RT424012
12VDC
K3
RT424012
12VDC
K4
RT424012
12VDC
K5
RT424012
12VDC
4-B8
_EXP_START_TOMO
4-B10,2-E1
_EXP_CMD1
+15V_IF
U1
uln2803a
4-A10,2-B10>2
WS_TOMO
4-A8,2-F11>2
WS_TAB_BUCK
4-A10,2-G11>2
WS_DIR
GROUND
2-G11>2
EXP_DEM1
4-A8,2-B10>2
WS_WALL_BUCK
4-D11
VAC1
4-D11>2
VAC2
+12V_IF
NC
R51
100K
n76538
N1
R23
100K
T110V
J5
Angled
Male
LMI
TABLE BUCKY
J6
Angled
Male
LMI
WALL BUCKY
M
U2
L78M12
Vi
Vo
GND
C7
15uF
25V
20%
C17
100nF
C9
470nF
BLOCK PATHNAME $PROJECT_JEDI/asian_if_v2b_ASM/asian_if_v2b
BLOCK SHT 3 OF 5
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE BAPTISTE DATE 21/09/98
CHECK CASTEIGNAU DATE 21/09/98
APPR DUMOURIER DATE 21/09/98
OTHER NAME DATE DD/MM/YY
GE Medical Systems
BUC - FRANCE
DESIGN TITLE ASIAN_IF V2
FIRST MADE FOR JEDI
DRAWING NO. 2226456SCH
REV A
SIZE 3
SHT/CONT. ON 3 / 5

Illustration - I/F Board RAD V2 Electrical Schematics, Sheet 4

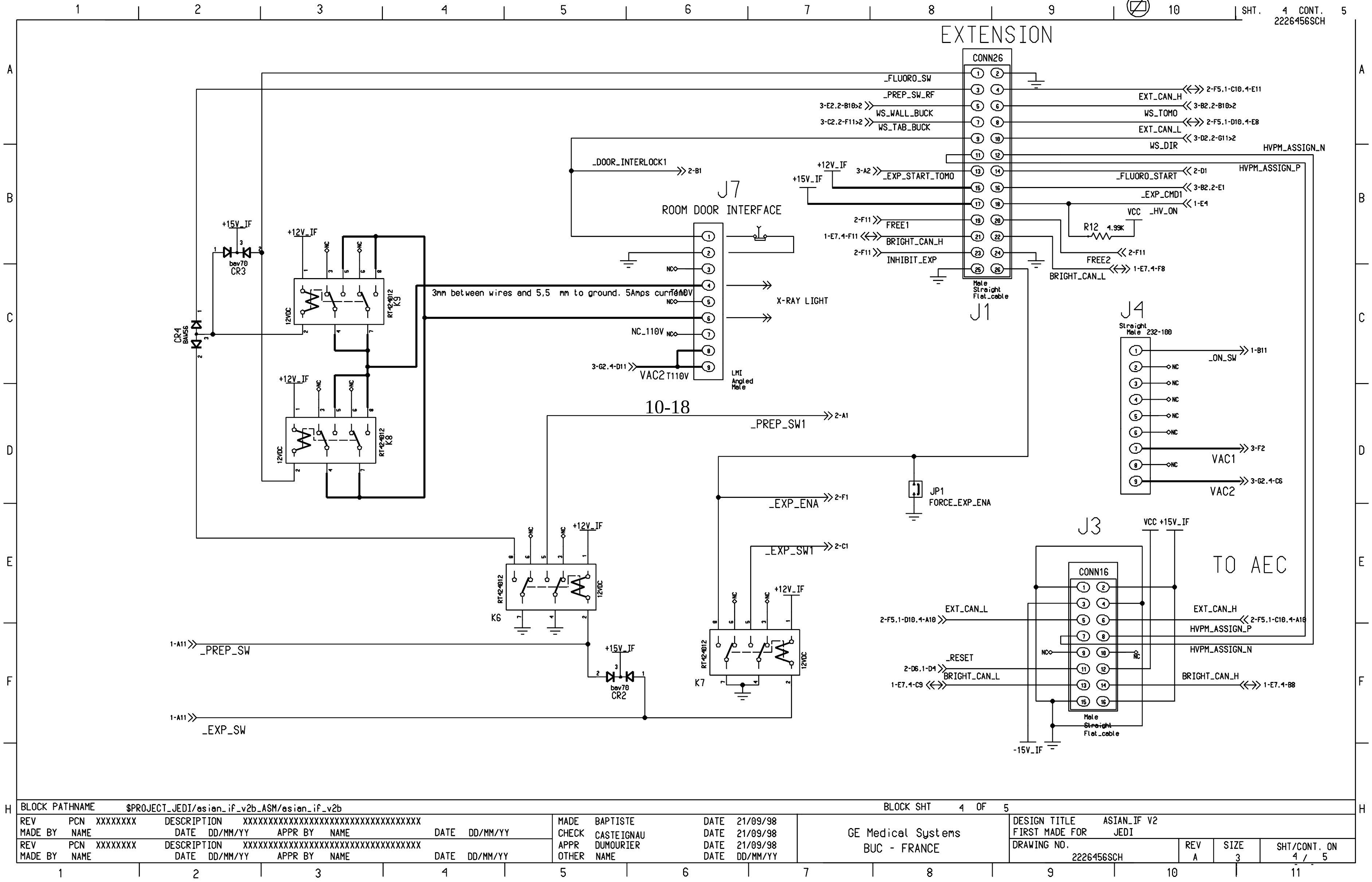

SHT. 4 CONT. 5
2226456SCH
EXTENSION
CONN26
_FLUORO_SW
_PREP_SW_RF
3-E2.2-B10>2
WS_WALL_BUCK
3-C2.2-F11>2
WS_TAB_BUCK
EXT_CAN_H
2-F5.1-C10.4-E11
WS_TOMO
3-B2.2-B10>2
EXT_CAN_L
2-F5.1-D10.4-E8
WS_DIR
3-D2.2-G11>2
HVPM_ASSIGN_N
HVPM_ASSIGN_P
_DOOR_INTERLOCK1
2-B1
+12V_IF
+15V_IF
3-A2
_EXP_START_TOMO
_FLUORO_START
2-D1
_EXP_CMD1
3-B2.2-E1
_HV_ON
1-E4
VCC
R12 4.99K
2-F11
FREE1
1-E7.4-F11
BRIGHT_CAN_H
INHIBIT_EXP
FREE2
BRIGHT_CAN_L
1-E7.4-F8
Male
Straight
Flat_cable
J1
J7
ROOM DOOR INTERFACE
NC
3mm between wires and 5,5 mm to ground. 5Amps current
T110V
X-RAY LIGHT
NC_110V
3-G2.4-D11
VAC2
LMI
Angled
Male
10-18
_PREP_SW1
2-A1
CR3
bav70
CR4
BAW56
12VDC
RT424012
K9
K8
K6
K7
_EXP_ENA
2-F1
JP1
FORCE_EXP_ENA
_EXP_SW1
2-C1
1-A11
_PREP_SW
_EXP_SW
CR2
J4
Straight
Male 232-100
_ON_SW
1-B11
VAC1
3-F2
3-G2.4-C6
J3
TO AEC
VCC +15V_IF
CONN16
2-F5.1-D10.4-A10
2-F5.1-C10.4-A10
_RESET
2-D6.1-D4
1-E7.4-C9
1-E7.4-B8
-15V_IF
BLOCK PATHNAME $PROJECT_JEDI/asian_if_v2b_ASM/asian_if_v2b
BLOCK SHT 4 OF 5
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE BAPTISTE DATE 21/09/98
CHECK CASTEIGNAU DATE 21/09/98
APPR DUMOURIER DATE 21/09/98
OTHER NAME DATE DD/MM/YY
GE Medical Systems
BUC - FRANCE
DESIGN TITLE ASIAN_IF V2
FIRST MADE FOR JEDI
DRAWING NO. 2226456SCH
REV A
SIZE 3
SHT/CONT. ON 4 / 5

Illustration- KV control board _V2C Sheet 1

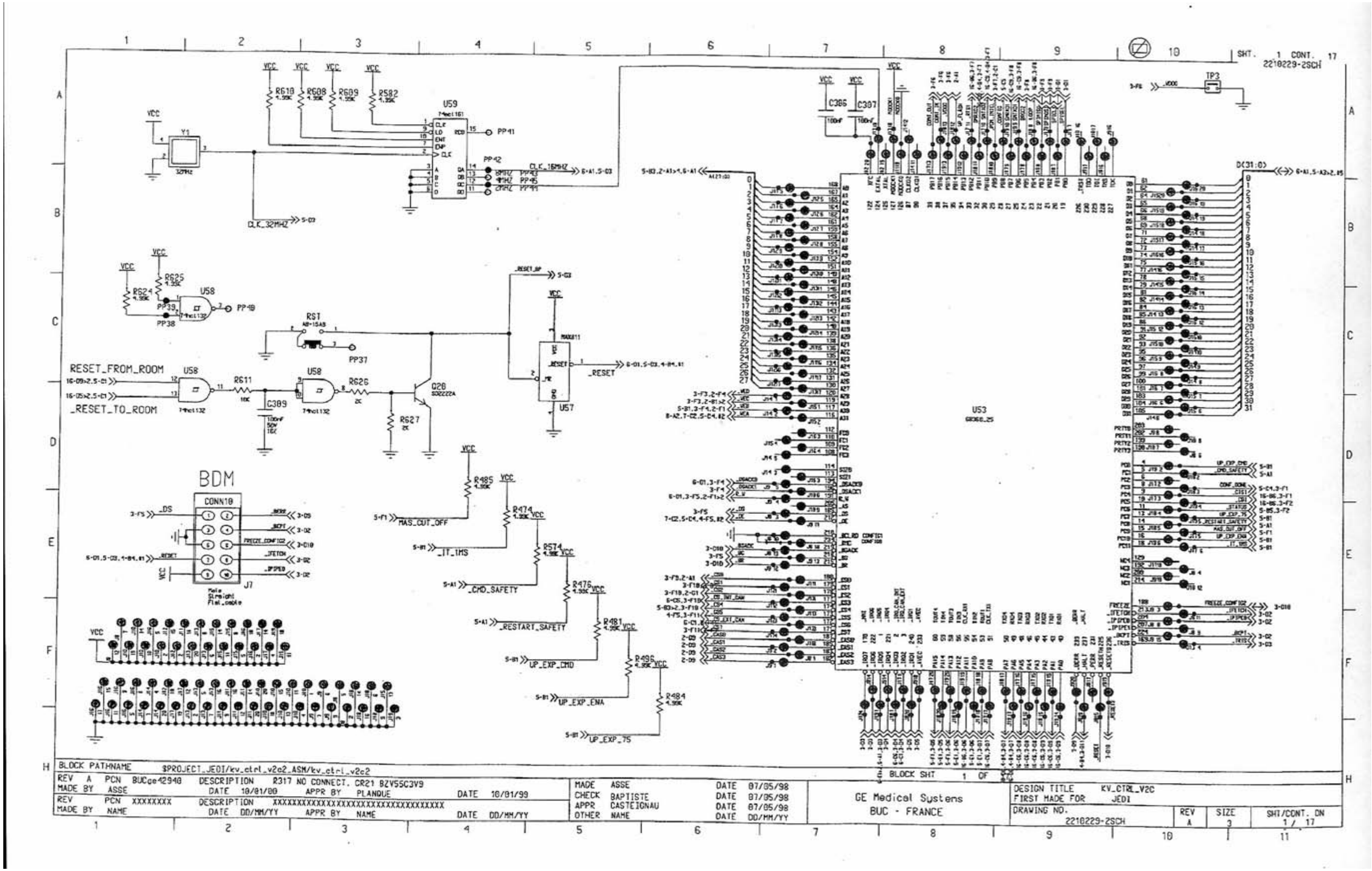

SHT. 1 CONT. 17
2210229-2SCH
Y1
32MHZ
U59
74act161
PP41
PP42
CLK_16MHZ
8MHZ PP43
4MHZ PP45
2MHZ PP44
CLK_32MHZ
R610
R608
R609
R582
VCC
U58
74act132
PP39
PP38
PP40
R624
R625
RST
PP37
_RESET_BP
MAX811
_RESET
U57
RESET_FROM_ROOM
_RESET_TO_ROOM
R611
C389
R626
Q28
R627
U53
68360_25
C386
C387
TP3
D(31:0)
BDM
CONN10
J7
Male Straight Flat_cable
_DS
_BKPT
FREEZE_CONFIG2
_IFETCH
_IPIPE0
R485
R474
R574
R476
R481
R496
R484
MAS_CUT_OFF
_IT_1MS
_CMD_SAFETY
_RESTART_SAFETY
UP_EXP_CMD
UP_EXP_ENA
UP_EXP_75
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT. CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
GE Medical Systems
BUC - FRANCE
BLOCK SHT 1 OF
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 1 / 17

Illustration- KV control board _V2C Sheet 2

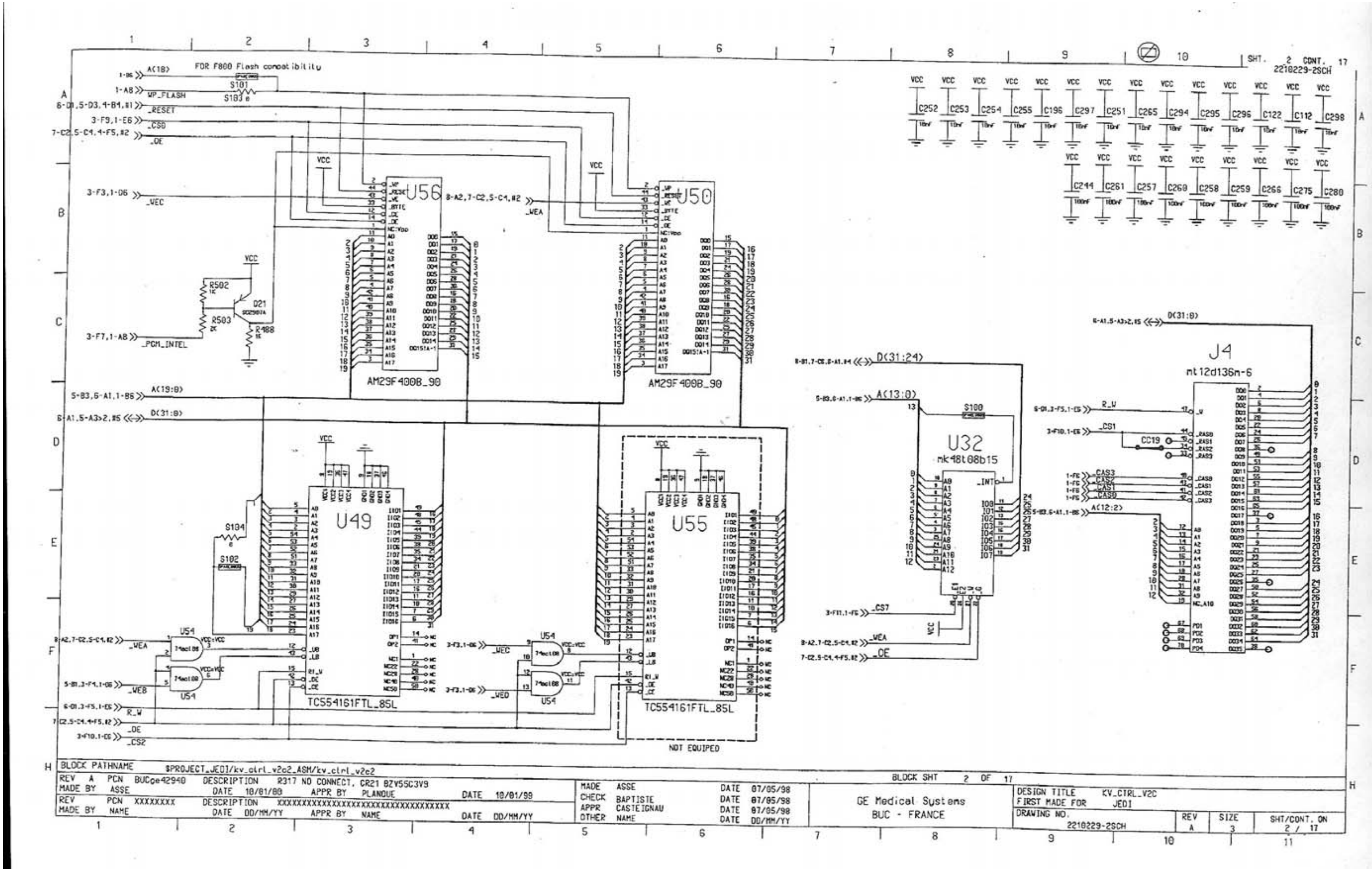

FOR F800 Flash compatibility
A(18)
WP_FLASH
_RESET
_CS0
_OE
S101
S103
_WEC
_WEA
U56
AM29F400B_90
U50
AM29F400B_90
VCC
R502
R503
R488
Q21
_PCM_INTEL
A(19:0)
D(31:0)
U49
TC554161FTL_85L
U55
TC554161FTL_85L
NOT EQUIPED
S104
S102
U54
74act08
_WEB
_WED
R_W
_CS2
D(31:24)
A(13:0)
S100
U32
mk48t08b15
_INT
_CS7
_OE
J4
mt12d136n-6
D(31:0)
_CS1
CC19
CAS3
CAS2
CAS1
CAS0
A(12:2)
C252
C253
C254
C255
C196
C297
C251
C265
C294
C295
C296
C122
C112
C298
C244
C261
C257
C260
C258
C259
C266
C275
C280
10nF
100nF
SHT. 2 CONT. 17
2210229-2SCH
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 2 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 2 / 17

Illustration- KV control board _V2C Sheet 3

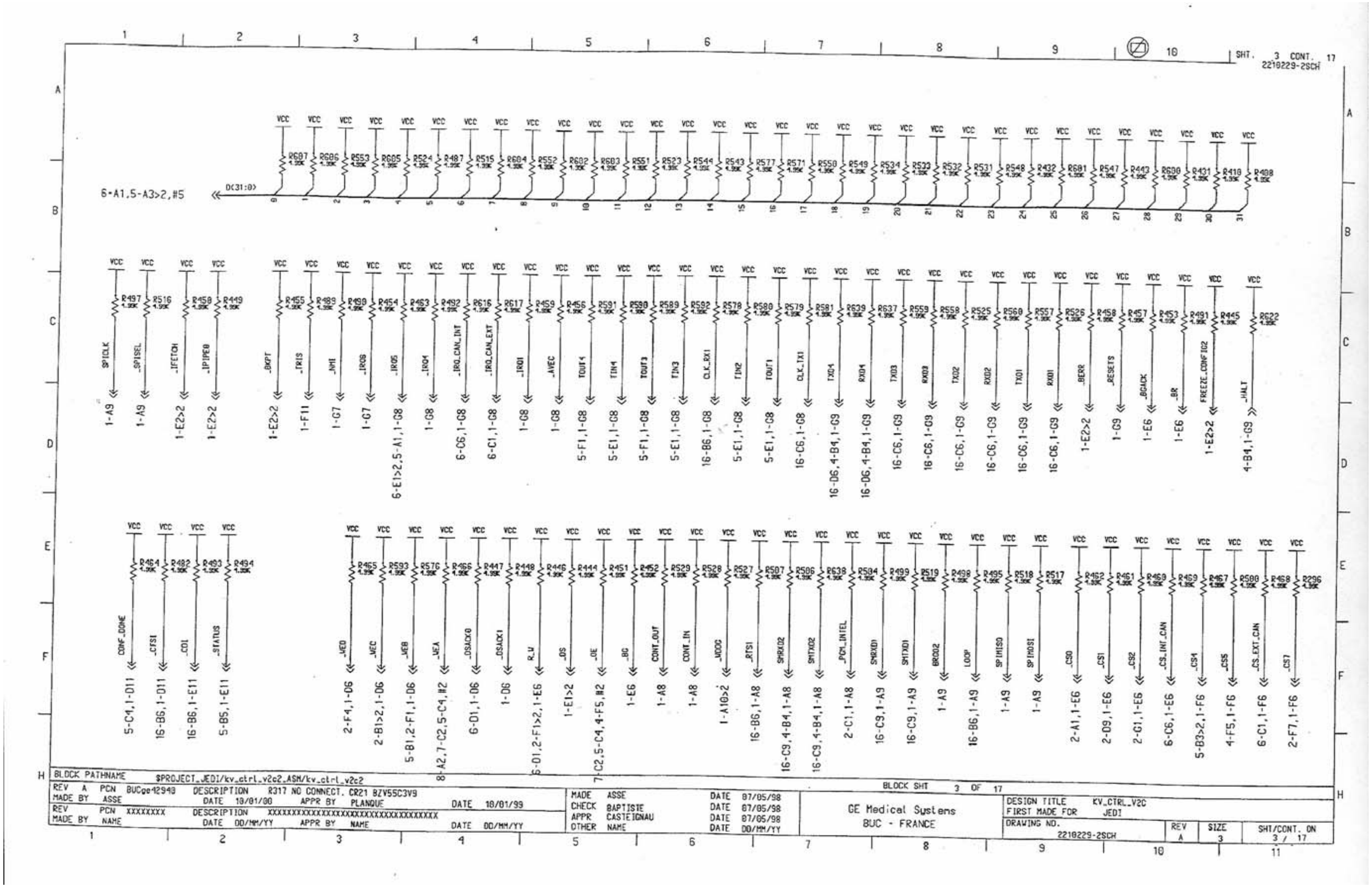

SHT. 3 CONT. 17
2210229-2SCH
6-A1.5-A3>2,#5
D(31:0)
VCC
SPICLK
_SPISEL
_IFETCH
_IPIPE0
_BKPT
_TRIS
_NMI
_IRQ6
_IRQ5
_IRQ4
_IRQ_CAN_INT
_IRQ_CAN_EXT
_IRQ1
_AVEC
TOUT4
TIN4
TOUT3
TIN3
CLK_RX1
TIN2
TOUT1
CLK_TX1
TXD4
RXD4
TXD3
RXD3
TXD2
RXD2
TXD1
RXD1
_BERR
_RESETS
_BGACK
_BR
FREEZE_CONFIG2
_HALT
CONF_DONE
_CFSI
_CDI
_STATUS
_WED
_WEC
_WEB
_WEA
_DSACK0
_DSACK1
R_W
_DS
_OE
_BG
CONT_OUT
CONT_IN
_WDOG
_RTS1
SMRXD2
SMTXD2
_PCM_INTEL
SMRXD1
SMTXD1
BRGO2
LOOP
SPIMISO
SPIMOSI
_CS0
_CS1
_CS2
_CS_INT_CAN
_CS4
_CS5
_CS_EXT_CAN
_CS7
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge12940 DESCRIPTION R317 NO CONNECT. CR21 BZV55C3V9
MADE BY ASSE DATE 18/01/00 APPR BY PLANQUE DATE 18/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 3 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 3 / 17

Illustration- KV control board _V2C Sheet 4

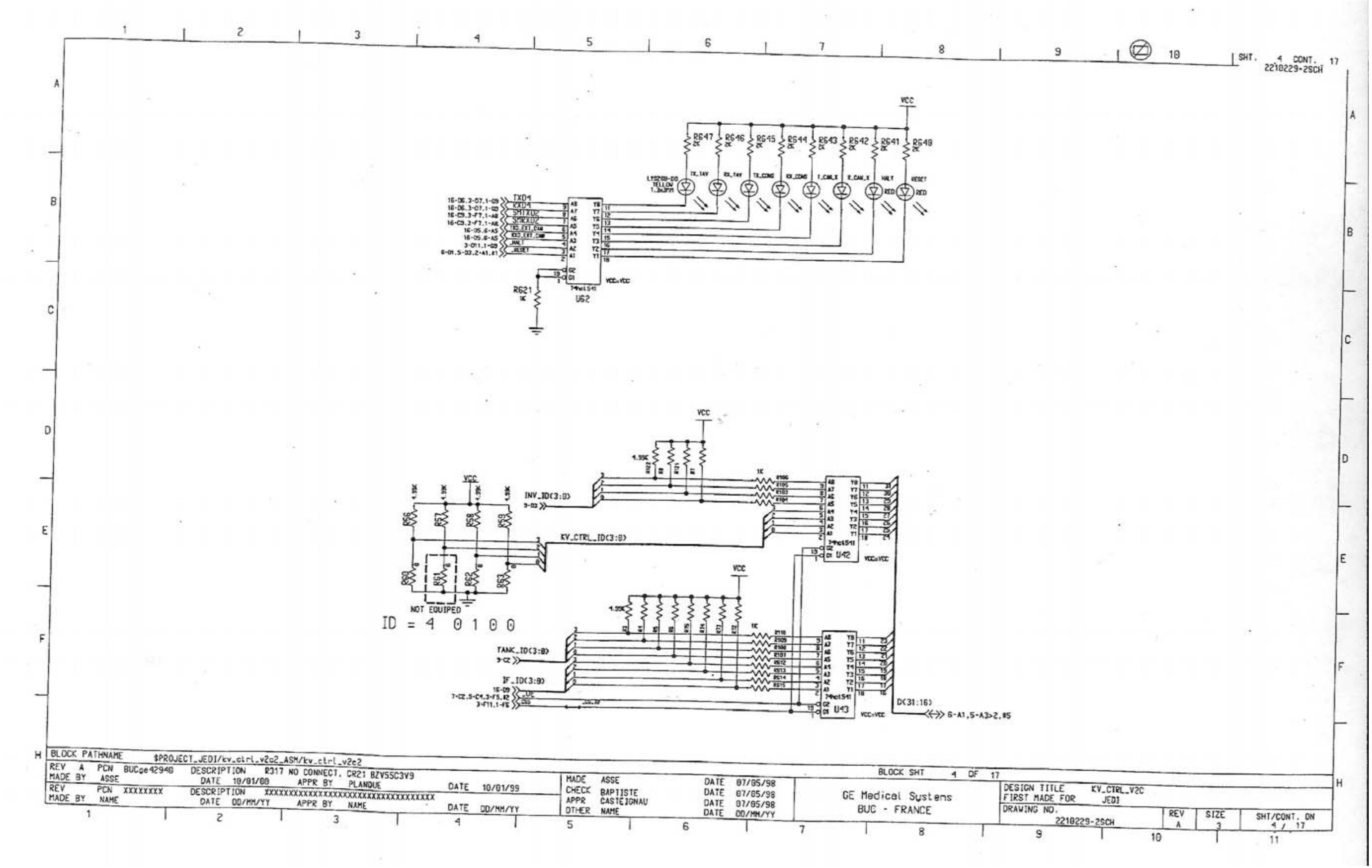

SHT. 4 CONT. 17
2210229-2SCH
VCC
R647 2K
R646 2K
R645 2K
R644 2K
R643 2K
R642 2K
R641 2K
R640 2K
LYS260-D0 YELLOW 1.3x3MM
TX_TAV
RX_TAV
TX_CONS
RX_CONS
T_CAN_X
R_CAN_X
HALT
RESET
RED
RED
16-D6.3-D7.1-G9
16-D6.3-D7.1-G9
16-C9.3-F7.1-A8
16-C9.3-F7.1-A8
16-D5.6-A5
16-D5.6-A5
3-D11.1-G9
6-D1.5-D3.2-A1.#1
TXD4
RXD4
SMTXD2
SMRXD2
TXD_EXT_CAN
RXD_EXT_CAN
_HALT
_RESET
74hct541
U62
VCC=VCC
R621 1K
VCC
4.99K
R56
R57
R58
R59
R60
R61
R62
R63
NOT EQUIPED
ID = 4 0100
INV_ID(3:0)
9-D3
KV_CTRL_ID(3:0)
1K
R106
R105
R103
R104
74hct541
U42
VCC=VCC
VCC
4.99K
1K
TANK_ID(3:0)
9-C2
IF_ID(3:0)
16-D9
7-C2.5-C4.3-F5.#2
3-F11.1-F6
_OE
CS5
74hct541
U43
VCC=VCC
D(31:16)
6-A1,5-A3>2,#5
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANDUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 4 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 4 / 17

Illustration- KV control board _V2C Sheet 5

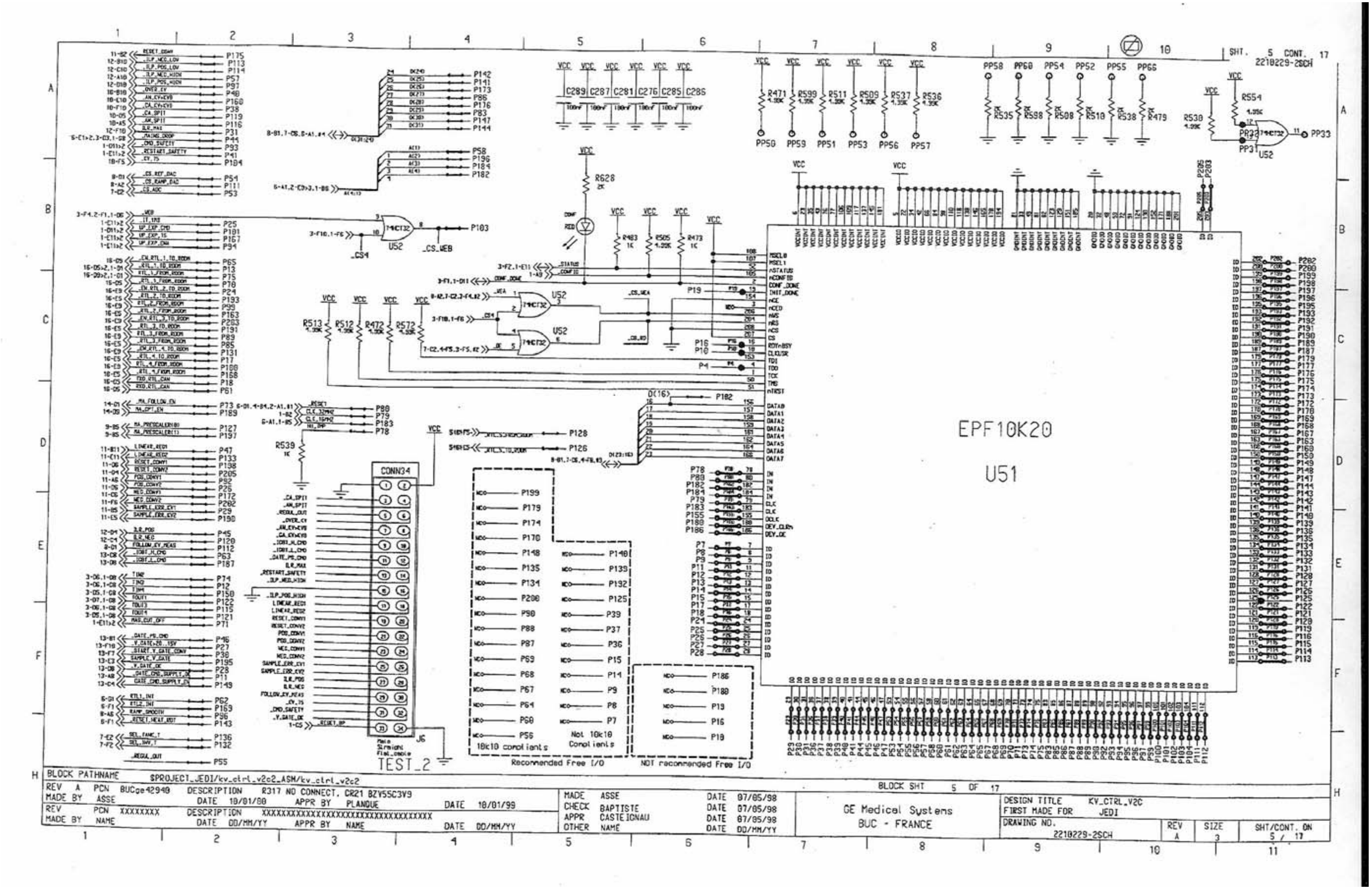

EPF10K20
U51
U52
74HCT32
CONN34
TEST_2
J6
Recommended Free I/O
NOT recommended Free I/O
10k10 coroliants
Not 10k10 Conoliants
SHT. 5 CONT. 17
2210229-2SCH
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT. CR21 BZV55C3V9
MADE BY ASSE DATE 18/01/00 APPR BY PLANQUE DATE 18/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 5 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 5 / 17

Illustration- KV control board _V2C Sheet 6

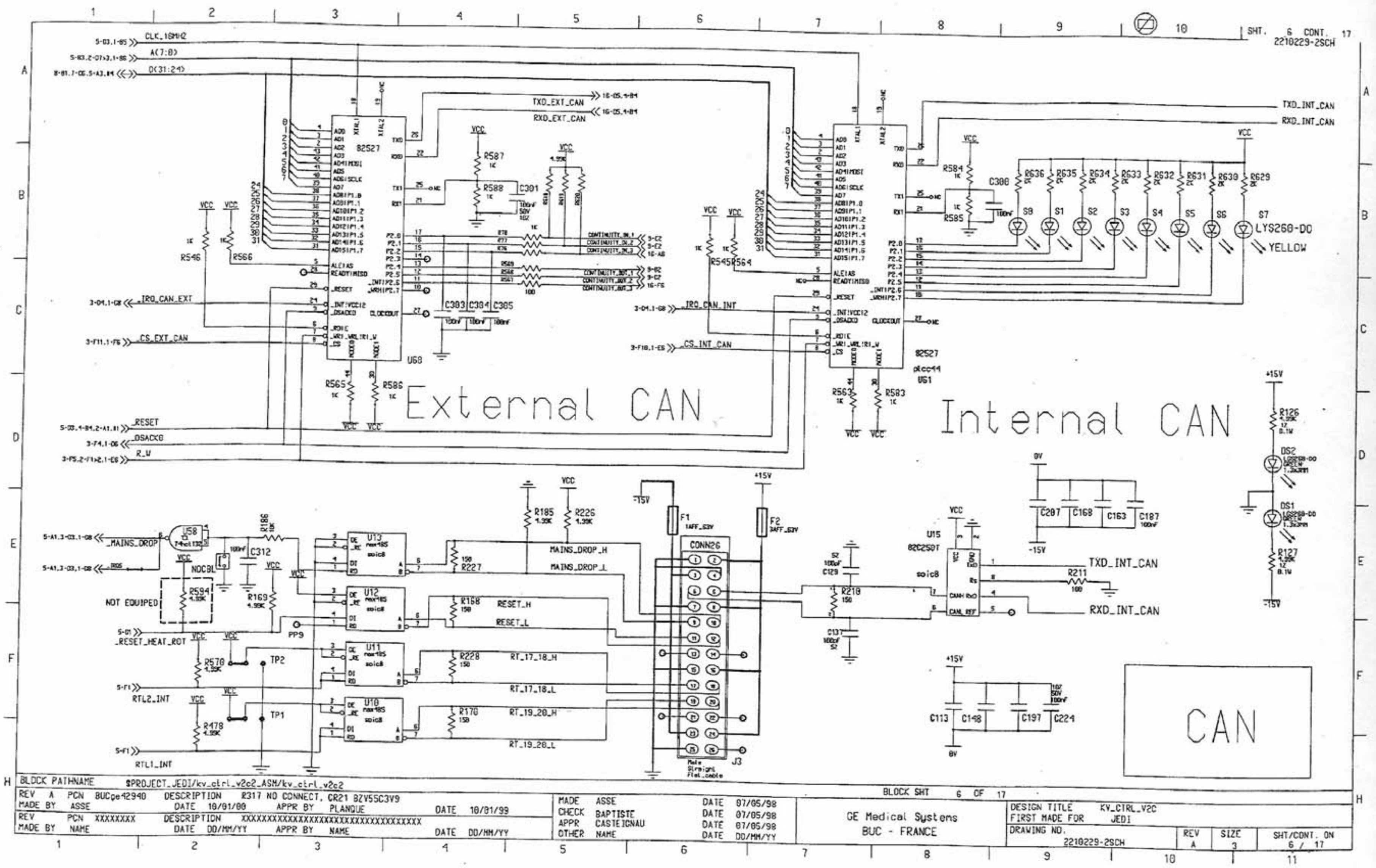

External CAN
Internal CAN
CAN
82527
U60
U61
plcc44
CLK_16MHZ
A(7:0)
D(31:24)
TXD_EXT_CAN
RXD_EXT_CAN
TXD_INT_CAN
RXD_INT_CAN
IRQ_CAN_EXT
CS_EXT_CAN
IRQ_CAN_INT
CS_INT_CAN
_RESET
_DSACK0
R_W
LYS260-D0
YELLOW
_MAINS_DROP
MAINS_DROP_H
MAINS_DROP_L
RESET_H
RESET_L
RT_17_18_H
RT_17_18_L
RT_19_20_H
RT_19_20_L
NOT EQUIPED
_RESET_HEAT_ROT
RTL2_INT
RTL1_INT
CONN26
J3
F1
F2
U15
82C250T
U13
U12
U11
U10
max485
U58
TP1
TP2
PP9
VCC
+15V
-15V
DS1
DS2
SHT. 6 CONT. 17
2210229-2SCH
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 6 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 6 / 17

Illustration- KV control board _V2C Sheet 7

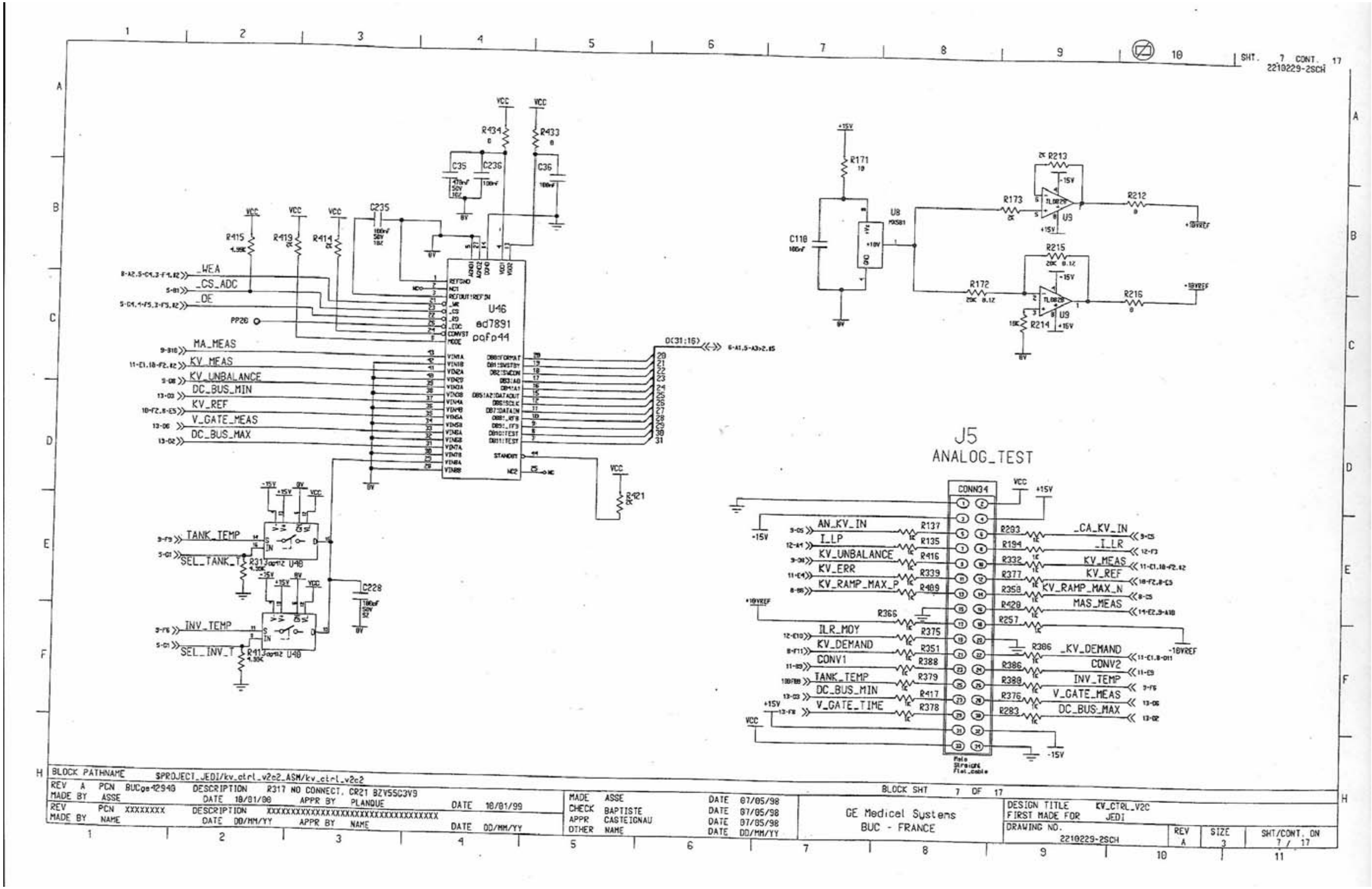

SHT. 7 CONT. 17
2210229-2SCH
U46
ad7891
pqfp44
_WEA
_CS_ADC
_OE
PP20
MA_MEAS
KV_MEAS
KV_UNBALANCE
DC_BUS_MIN
KV_REF
V_GATE_MEAS
DC_BUS_MAX
D(31:16)
R434
R433
C35
C236
C36
C235
R415
R419
R414
R421
VCC
0V
TANK_TEMP
SEL_TANK_T
R317
U40
INV_TEMP
SEL_INV_T
R413
C228
+15V
-15V
R171
C118
U8
R173
R213
R212
U9
TL082
R215
R172
R214
R216
+10VREF
-10VREF
J5
ANALOG_TEST
CONN34
AN_KV_IN
I_LP
KV_UNBALANCE
KV_ERR
KV_RAMP_MAX_P
R137
R135
R416
R339
R409
R366
ILR_MOY
KV_DEMAND
CONV1
TANK_TEMP
DC_BUS_MIN
V_GATE_TIME
R375
R351
R388
R379
R417
R378
R203
R194
R332
R377
R358
R420
R257
R386
R376
R283
_CA_KV_IN
_I_LR
KV_MEAS
KV_REF
KV_RAMP_MAX_N
MAS_MEAS
_KV_DEMAND
CONV2
INV_TEMP
V_GATE_MEAS
DC_BUS_MAX
Male Straight Flat_cable
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 7 OF 17
GE Medicel Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 7 / 17

Illustration- KV control board _V2C Sheet 8

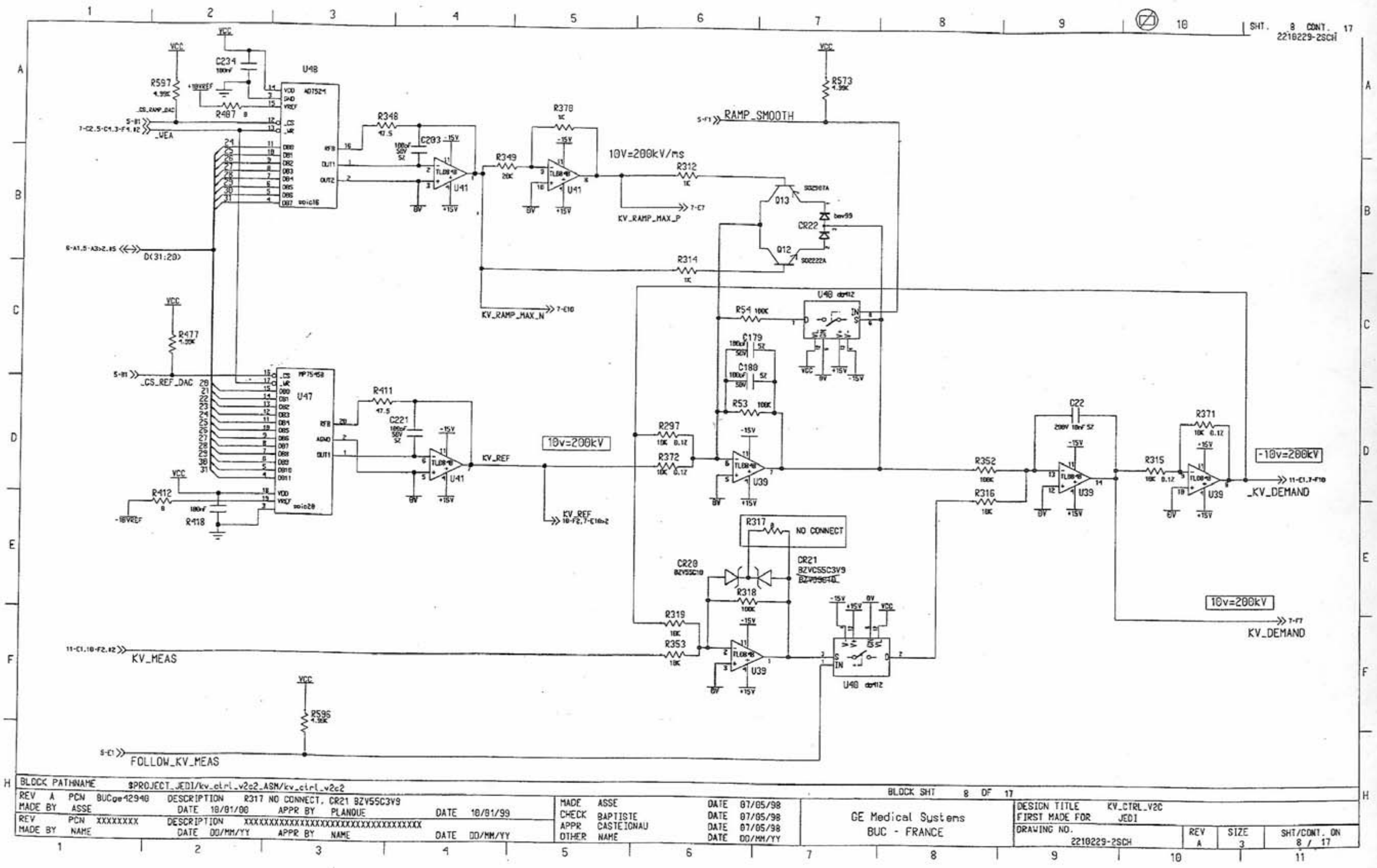

VCC
C234
R597
U48
AD7524
R487
_CS_RAMP_DAC
_WEA
R348
47.5
C203
R378
1K
R349
20K
U41
TL084B
10V=200kV/ms
R312
1K
S-F1 RAMP_SMOOTH
R573
4.99K
Q13
CR22
Q12
KV_RAMP_MAX_P
R314
1K
D(31:20)
KV_RAMP_MAX_N
U40
R54 100K
C179
C180
R53 100K
R477
4.99K
_CS_REF_DAC
U47
MP7545B
R411
47.5
C221
KV_REF
10V=200kV
KV_REF
R297
10K 0.1%
R372
10K 0.1%
U39
R412
R418
-10VREF
R352
100K
R316
10K
C22
R371
10K 0.1%
R315
10K 0.1%
-10V=200kV
_KV_DEMAND
R317
NO CONNECT
CR20
BZV55C10
CR21
BZV55C3V9
R318
100K
R319
10K
R353
10K
11-C1,10-F2,#2 KV_MEAS
10V=200kV
KV_DEMAND
U40 dg412
VCC
R596
4.99K
S-C1 FOLLOW_KV_MEAS
SHT. 8 CONT. 17
2210229-2SCH
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 8 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 8 / 17

Illustration- KV control board _V2C Sheet 9

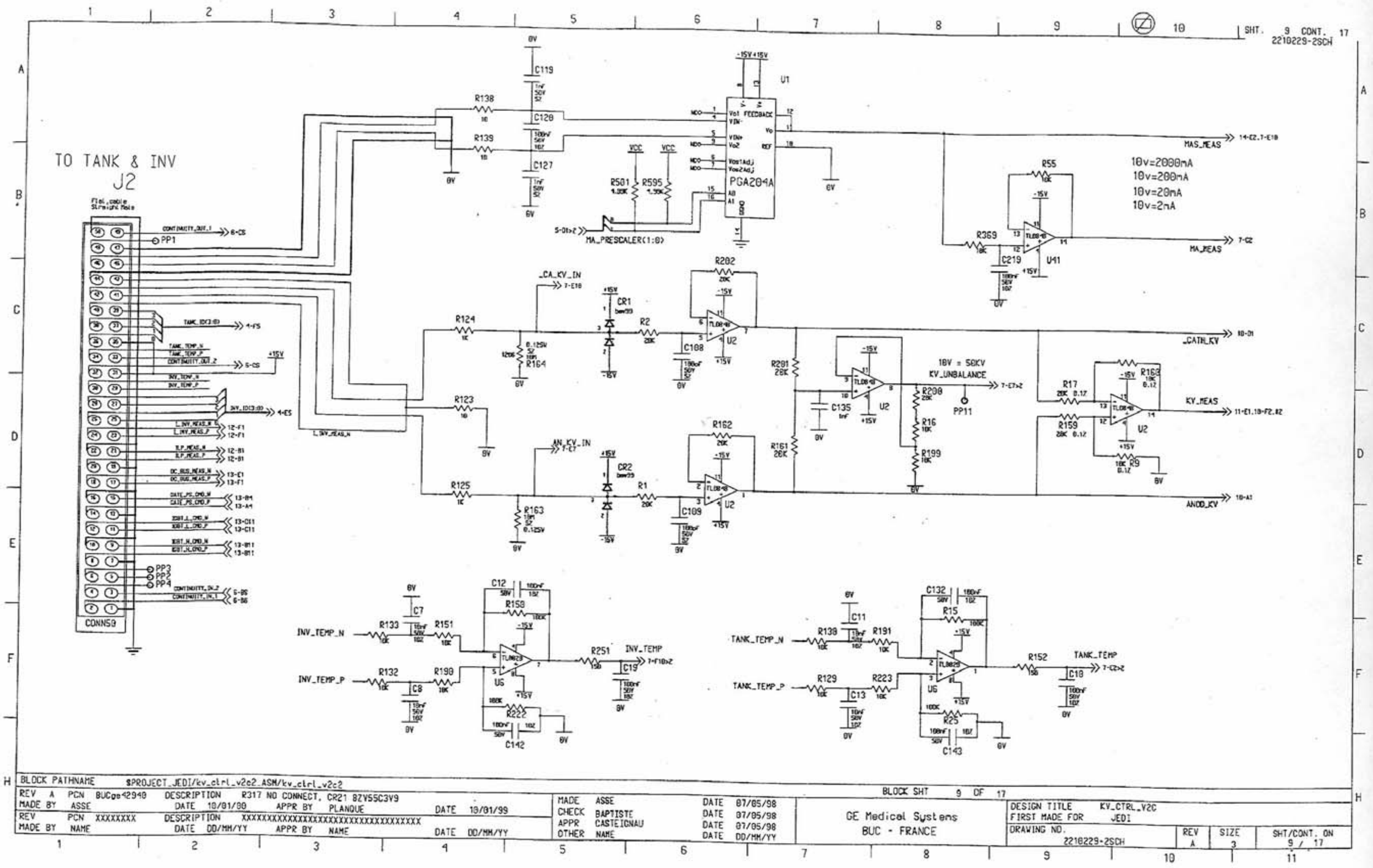

TO TANK & INV
J2
CONN50
PGA204A
U1
MAS_MEAS
MA_MEAS
MA_PRESCALER(1:0)
10V=2000mA
10V=200mA
10V=20mA
10V=2mA
_CA_KV_IN
AN_KV_IN
CATH_KV
ANOD_KV
KV_MEAS
10V = 50KV
KV_UNBALANCE
PP11
INV_TEMP_N
INV_TEMP_P
INV_TEMP
TANK_TEMP_N
TANK_TEMP_P
TANK_TEMP
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 8ZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 9 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 9 / 17
SHT. 9 CONT. 17
2210229-2SCH

Illustration- KV control board _V2C Sheet10

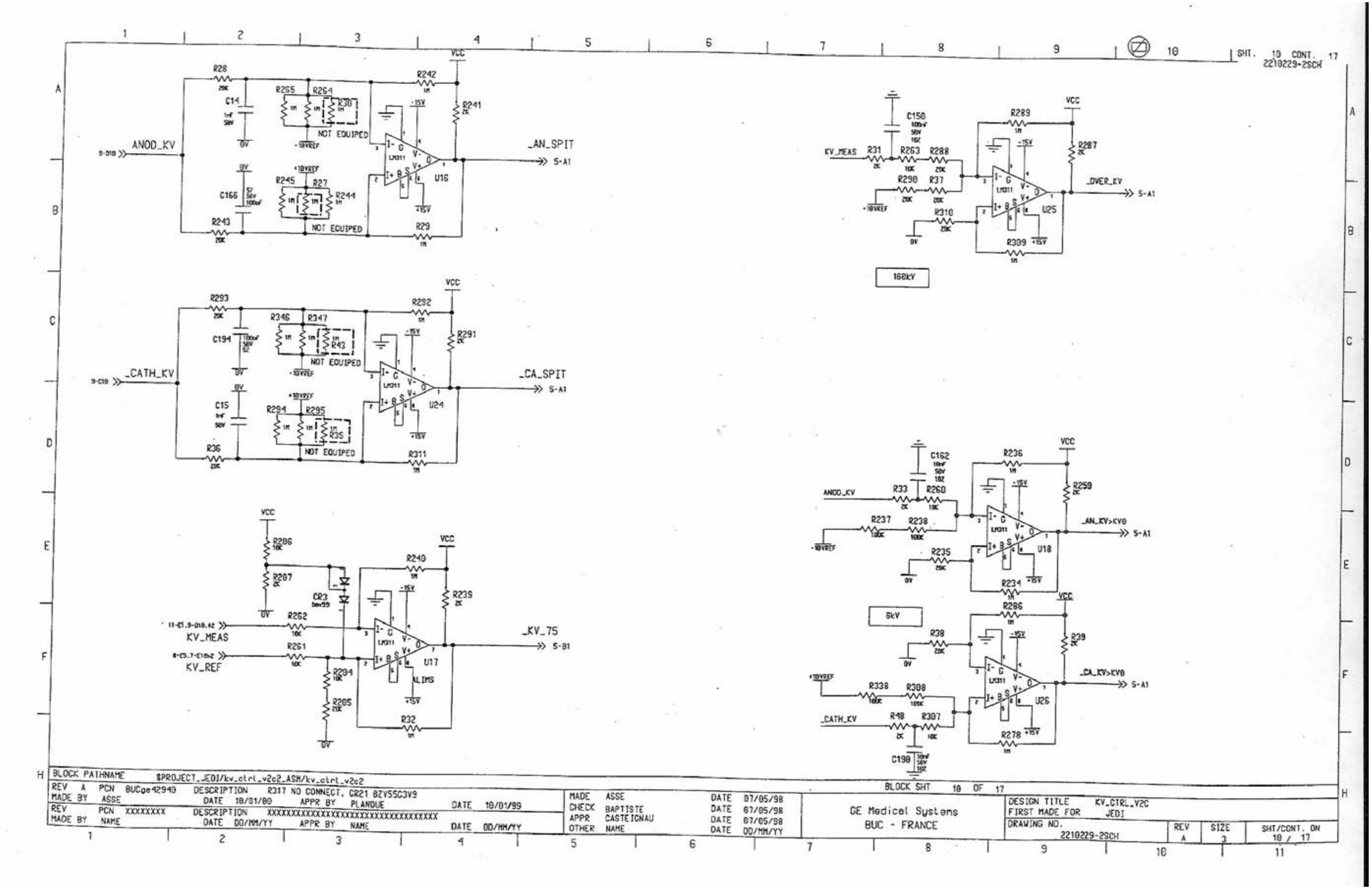

ANOD_KV
_AN_SPIT
U16
_CATH_KV
_CA_SPIT
U24
KV_MEAS
KV_REF
_KV_75
U17
KV_MEAS
_OVER_KV
U25
160kV
ANOD_KV
_AN_KV>KV0
U18
5kV
_CATH_KV
_CA_KV>KV0
U26
NOT EQUIPED
VCC
LM311
+10VREF
-10VREF
+15V
-15V
0V
5-A1
5-B1
SHT. 10 CONT. 17
2210229-2SCH
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT. CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
BLOCK SHT 10 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 10 / 17

Illustration- KV control board _V2C Sheet11

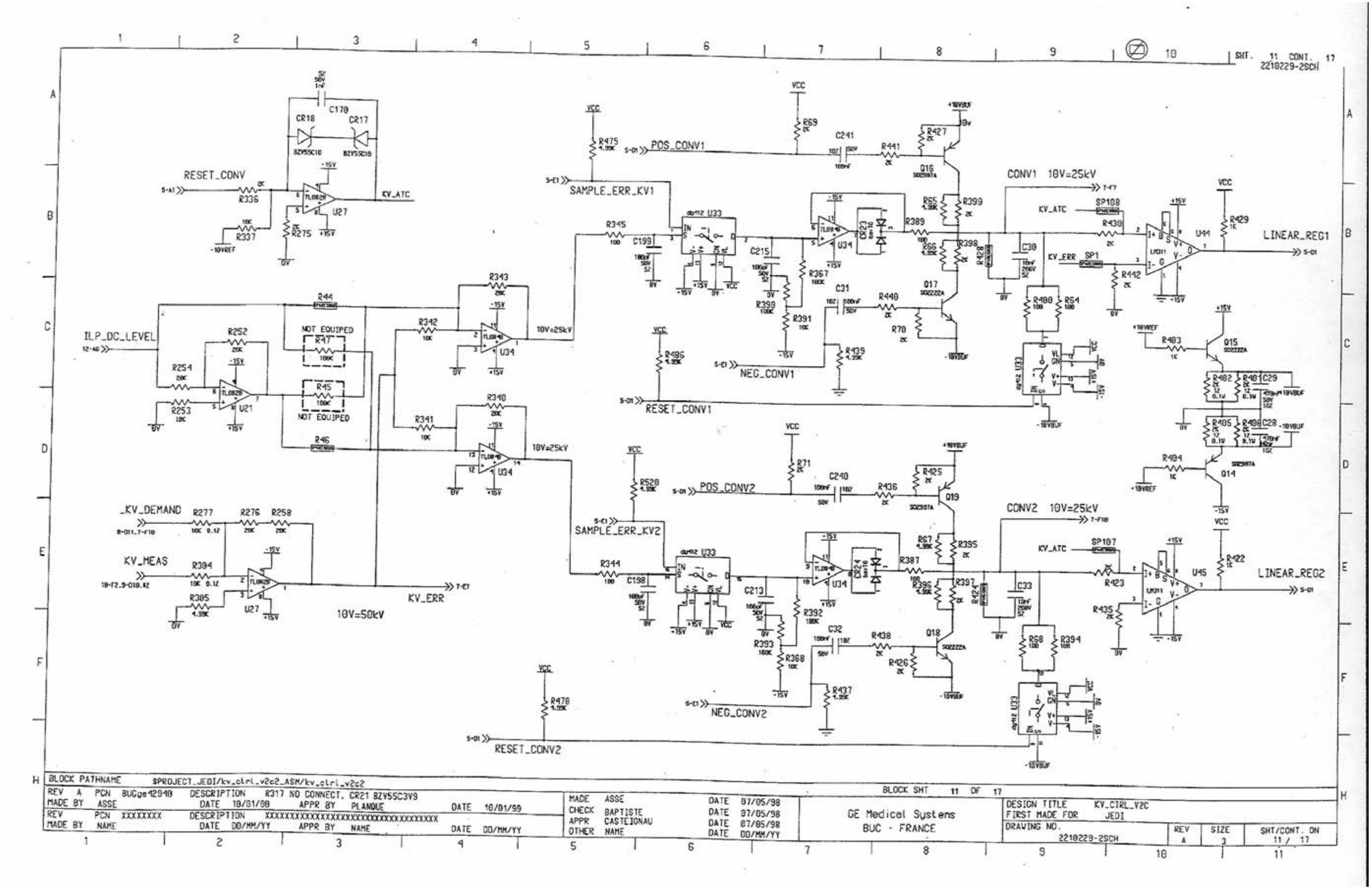

SHT. 11 CONT. 17
2210229-2SCH
RESET_CONV
R336
R337
R275
-10VREF
C170
CR18
CR17
BZV55C10
U27
TL082B
KV_ATC
ILP_DC_LEVEL
R252
R254
R253
U21
R44
NOT EQUIPED
R47
R45
R46
R342
R343
R341
R340
U34
10V=25kV
_KV_DEMAND
KV_MEAS
R277
R276
R258
R304
R305
KV_ERR
10V=50kV
VCC
R475
POS_CONV1
SAMPLE_ERR_KV1
R345
C199
U33
C215
R390
R391
R367
C31
R440
R70
R486
NEG_CONV1
R439
RESET_CONV1
R69
C241
R441
R427
Q16
+10VBUF
-10VBUF
R65
R399
R389
CR23
R66
R398
R428
Q17
C30
CONV1 10V=25kV
KV_ATC
SP108
R430
KV_ERR
SP1
R442
U44
LM311
R429
LINEAR_REG1
R400
R64
R403
Q15
R402
R401
C29
R405
R406
C28
R404
Q14
R528
POS_CONV2
SAMPLE_ERR_KV2
R344
C198
C213
R393
R368
R392
C32
R438
R426
R437
NEG_CONV2
R478
RESET_CONV2
R71
C240
R436
R425
Q19
R67
R395
R387
CR24
R396
R397
R424
Q18
C33
CONV2 10V=25kV
SP107
R423
R435
U45
R422
LINEAR_REG2
R68
R394
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 11 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 11 / 17

Illustration- KV control board _V2C Sheet12

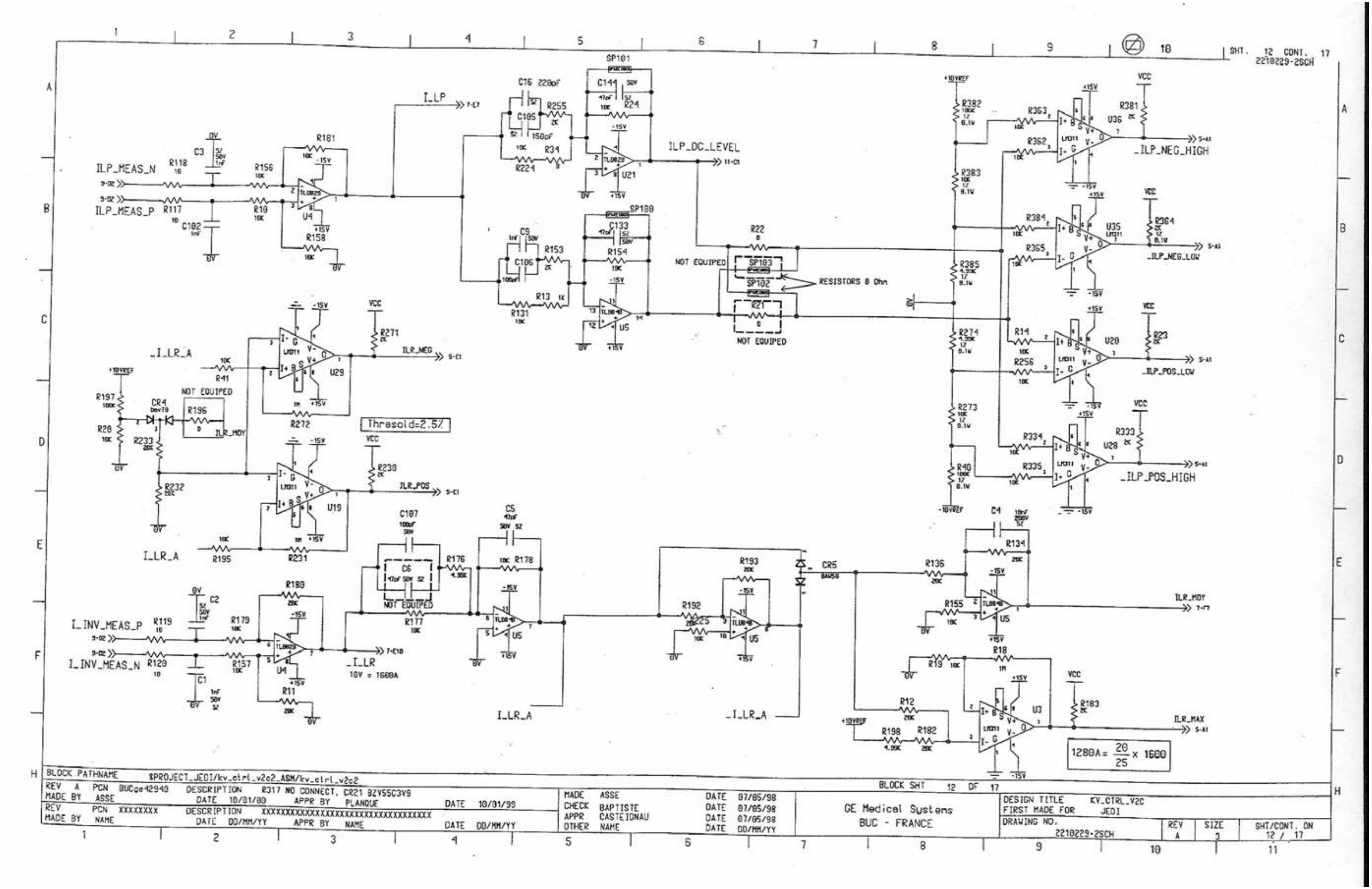

ILP_MEAS_N
ILP_MEAS_P
I_LP
ILP_DC_LEVEL
SP101
SP100
SP103
SP102
NOT EQUIPED
RESISTORS 0 Ohm
_ILP_NEG_HIGH
_ILP_NEG_LOW
_ILP_POS_LOW
_ILP_POS_HIGH
+10VREF
-10VREF
VCC
+15V
-15V
0V
_I_LR_A
ILR_NEG
ILR_POS
ILR_MOY
ILR_MAX
Thresold=2.5V
I_LR_A
I_INV_MEAS_P
I_INV_MEAS_N
_I_LR
10V = 1600A
CR5
BAV58
1280A = 20/25 x 1600
U4
U21
U5
U29
U19
U36
U35
U20
U28
U3
LM311
TL082B
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 12 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 12 / 17
SHT. 12 CONT. 17
2210229-2SCH

Illustration- KV control board _V2C Sheet13

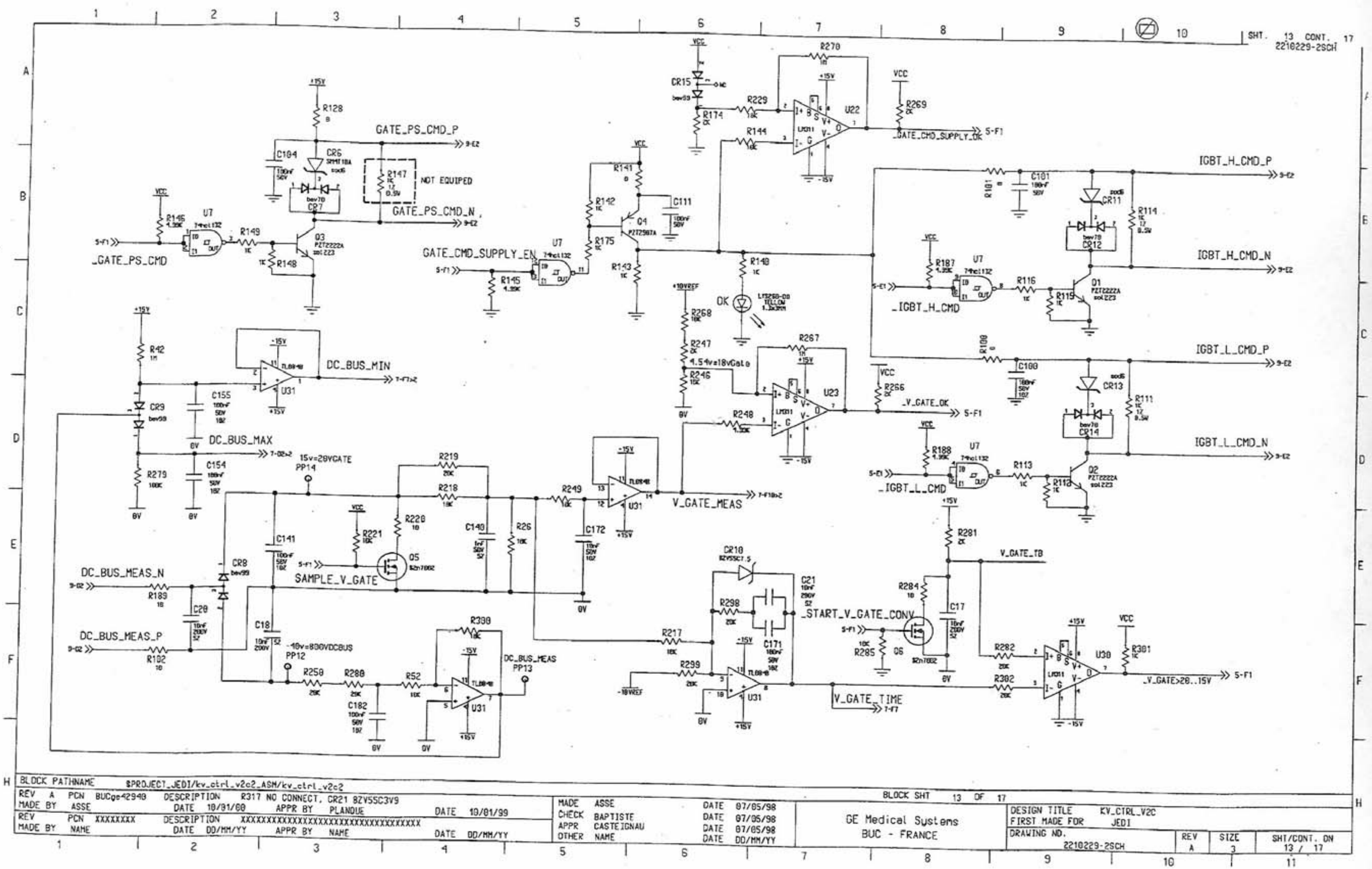

SHT. 13 CONT. 17
2210229-2SCH
GATE_PS_CMD_P
GATE_PS_CMD_N
NOT EQUIPED
_GATE_PS_CMD
GATE_CMD_SUPPLY_EN
_GATE_CMD_SUPPLY_OK
IGBT_H_CMD_P
IGBT_H_CMD_N
_IGBT_H_CMD
IGBT_L_CMD_P
IGBT_L_CMD_N
_IGBT_L_CMD
DC_BUS_MIN
DC_BUS_MAX
15v=20VGATE
PP14
V_GATE_MEAS
4.5Vv=18VGate
_V_GATE_OK
V_GATE_TB
_START_V_GATE_CONV
_V_GATE>20..15V
V_GATE_TIME
DC_BUS_MEAS_N
DC_BUS_MEAS_P
DC_BUS_MEAS
PP13
-10v=800VDCBUS
PP12
SAMPLE_V_GATE
+10VREF
-10VREF
U7 U22 U23 U30 U31
Q1 Q2 Q3 Q4 Q5 Q6
OK
LTS250-00 YELLOW
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 13 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 13 / 17

Illustration- KV control board _V2C Sheet14

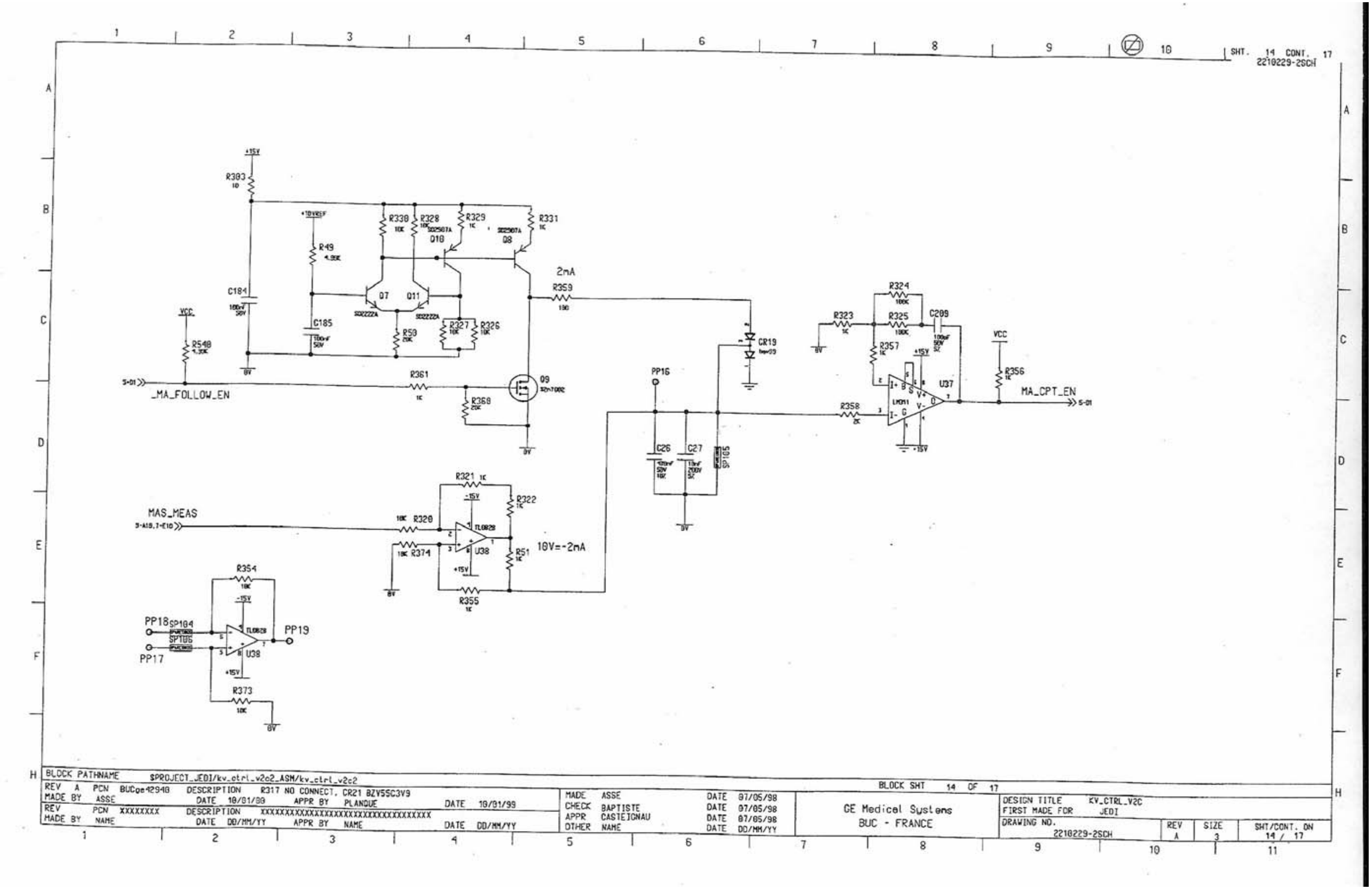

SHT. 14 CONT. 17
2210229-2SCH
+15V
R303
+10VREF
R49
C184
R330
R328
R329
R331
2N2907A
Q10
Q8
Q7
Q11
2N2222A
R50
R327
R326
C185
VCC
R548
2mA
R359
100
CR19
0V
S-01
_MA_FOLLOW_EN
R361
R360
Q9
2N7002
PP16
C26
C27
SP105
MAS_MEAS
S-A18,7-E10
R321
-15V
R322
R320
R374
TL082B
U38
R51
10V=-2mA
R355
R354
PP18
SP104
SP106
PP17
PP19
R373
R324
R323
R325
C209
R357
VCC
R356
U37
LM311
R358
MA_CPT_EN
S-01
-15V
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/99 APPR BY PLANQUE DATE 10/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 14 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 14 / 17

Illustration- KV control board _V2C Sheet15

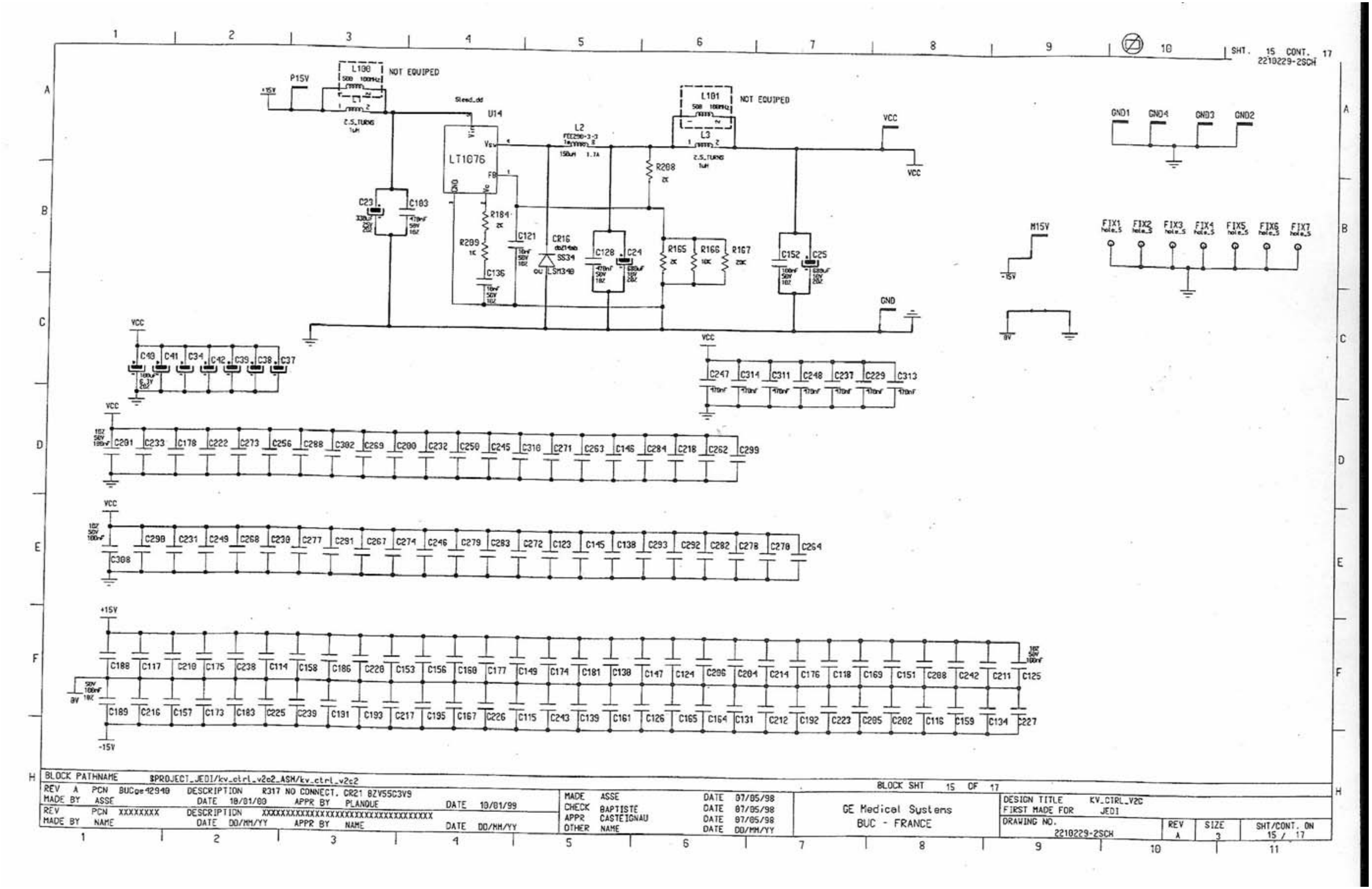
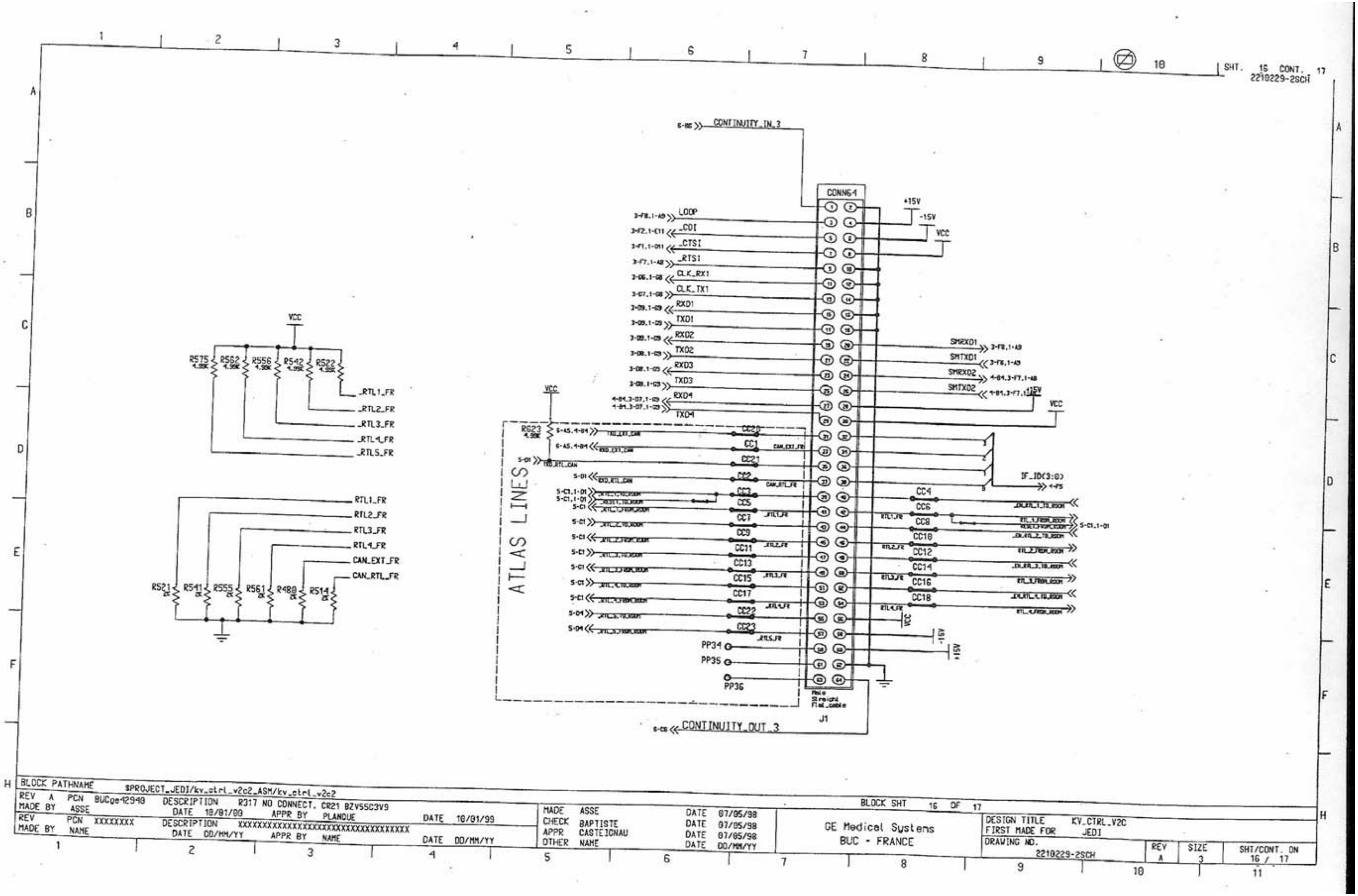
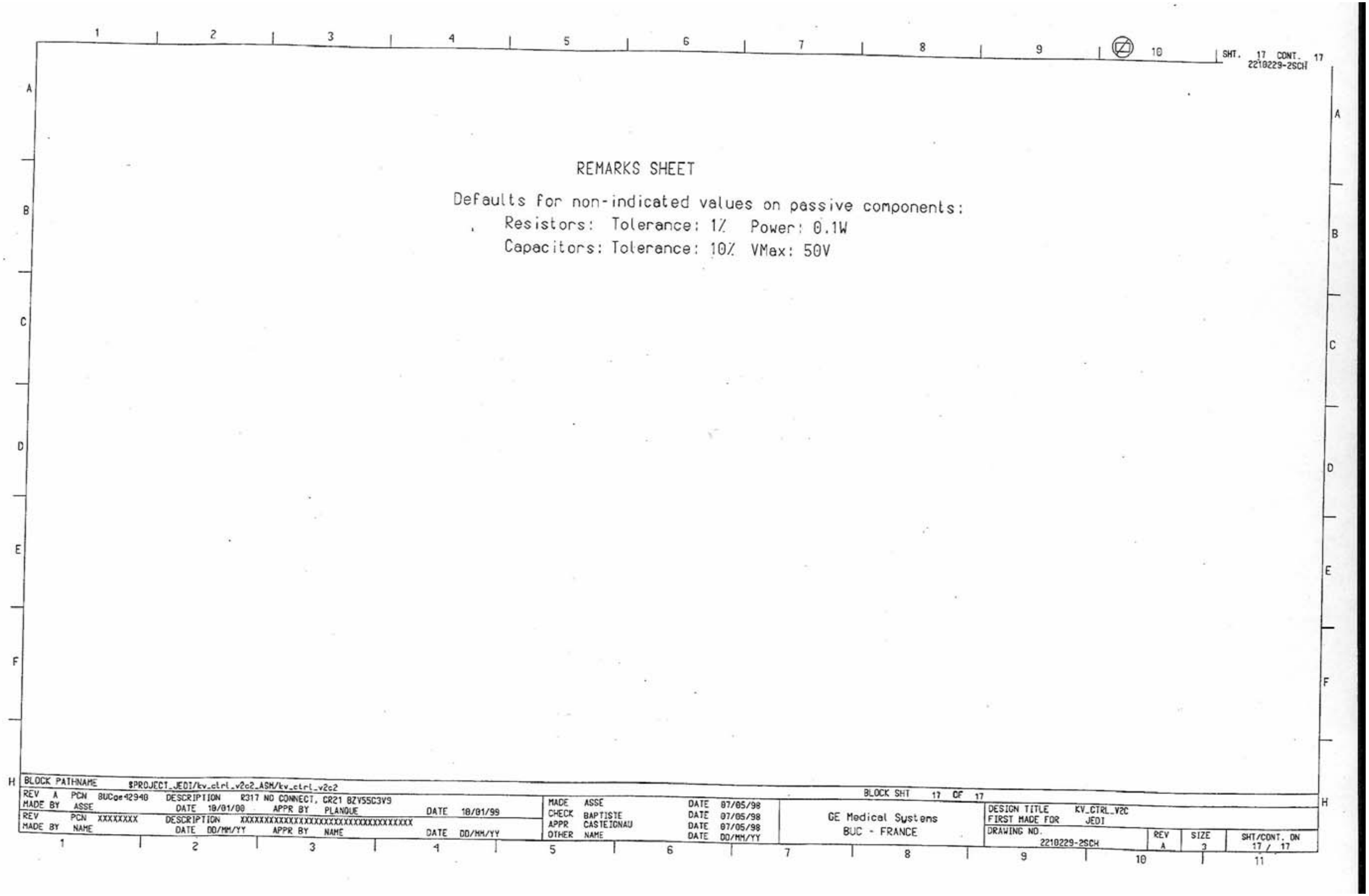

P15V
+15V
L100 NOT EQUIPED
L1 2.5_TURNS 1uH
Sleed_dd
U14
LT1076
L2 150uH 1.7A
L101 NOT EQUIPED
L3 2.5_TURNS 1uH
VCC
R208 2K
C23 330uF 50V 20%
C183 470nF 50V 10%
R184 2K
R209 1K
C121
C136
CR16 SS34
C128
C24
R165 2K
R166 10K
R167 20K
C152
C25
GND
GND1 GND4 GND3 GND2
M15V
-15V
FIX1 FIX2 FIX3 FIX4 FIX5 FIX6 FIX7
0V
C40 C41 C34 C42 C39 C38 C37
C247 C314 C311 C248 C237 C229 C313
C201 C233 C178 C222 C273 C256 C288 C302 C269 C200 C232 C250 C245 C310 C271 C263 C146 C284 C218 C262 C299
C298 C231 C249 C268 C230 C277 C291 C267 C274 C246 C279 C283 C272 C123 C145 C138 C293 C292 C282 C278 C270 C264
C308
C188 C117 C210 C175 C238 C114 C158 C186 C228 C153 C156 C160 C177 C149 C174 C181 C130 C147 C124 C206 C204 C214 C176 C118 C169 C151 C208 C242 C211 C125
C189 C216 C157 C173 C183 C225 C239 C131 C193 C217 C195 C167 C226 C115 C243 C139 C161 C126 C165 C164 C131 C212 C192 C223 C205 C202 C116 C159 C134 C227
BLOCK PATHNAME $PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2
BLOCK SHT 15 OF 17
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT. CR21 BZV55C3V9
MADE BY ASSE DATE 10/01/00 APPR BY PLANQUE DATE 10/01/99
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 15 / 17

Illustration- KV control board _V2C Sheet16


SHT. 16 CONT. 17
2210229-2SCH
6-B5 CONTINUITY_IN_3
CONN64
+15V
-15V
VCC
3-F8,1-A9 LOOP
3-F2,1-C11 _CDI
3-F1,1-D11 _CTSI
3-F7,1-A8 _RTS1
3-D6,1-G8 CLK_RX1
3-D7,1-G8 CLK_TX1
3-D9,1-G9 RXD1
3-D9,1-D9 TXD1
3-D9,1-G9 RXD2
3-D8,1-G9 TXD2
3-D8,1-G5 RXD3
3-D8,1-G5 TXD3
4-B4,3-D7,1-G9 RXD4
4-B4,3-D7,1-G9 TXD4
SMRXD1 3-F8,1-A9
SMTXD1 3-F8,1-A9
SMRXD2 4-B4,3-F7,1-A8
SMTXD2 4-B4,3-F7,1-A8
IF_ID(3:0) 4-F5
R575 R562 R556 R542 R522 4.99K
_RTL1_FR
_RTL2_FR
_RTL3_FR
_RTL4_FR
_RTL5_FR
RTL1_FR
RTL2_FR
RTL3_FR
RTL4_FR
CAN_EXT_FR
CAN_RTL_FR
R521 R541 R555 R561 R480 R514 2K
R623 4.99K
ATLAS LINES
CC20 CC1 CC21 CC2 CC3 CC5 CC7 CC9 CC11 CC13 CC15 CC17 CC22 CC23
CC4 CC6 CC8 CC10 CC12 CC14 CC16 CC18
6-A5,4-B4 TXD_EXT_CAN
6-A5,4-B4 RXD_EXT_CAN
5-D1 TXD_RTL_CAN
5-D1 RXD_RTL_CAN
CAN_EXT_FR
CAN_RTL_FR
5-C1,1-D1
5-C1
5-D4
S-C1,1-D1
PP34
PP35
PP36
Male Straight Flat cable
J1
6-C6 CONTINUITY_OUT_3

BLOCK PATHNAME	$PROJECT_JEDI/kv_ctrl_v2c2_ASM/kv_ctrl_v2c2			
REV A PCN BUCge12940 MADE BY ASSE	DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9 DATE 18/01/00	APPR BY PLANQUE	DATE 18/01/99	BLOCK SHT 16 OF 17
REV PCN XXXXXXXX MADE BY NAME	DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX DATE DD/MM/YY	APPR BY NAME	DATE DD/MM/YY	
MADE ASSE	DATE 07/05/98	GE Medical Systems BUC - FRANCE	DESIGN TITLE KV_CTRL_V2C	
CHECK BAPTISTE	DATE 07/05/98		FIRST MADE FOR JEDI	
APPR CASTEIGNAU	DATE 07/05/98		DRAWING NO. 2210229-2SCH	REV A SIZE 3 SHT/CONT. ON 16 / 17
OTHER NAME	DATE DD/MM/YY			

Illustration- KV control board _V2C Sheet17



SHT. 17 CONT. 17
2210229-2SCH

REMARKS SHEET

Defaults for non-indicated values on passive components:
Resistors: Tolerance: 1% Power: 0.1W
Capacitors: Tolerance: 10% VMax: 50V

BLOCK PATHNAME $PROJECT_JEDI/kv_clrl_v2c2_ASM/kv_ctrl_v2c2
REV A PCN BUCge42940 DESCRIPTION R317 NO CONNECT, CR21 BZV55C3V9
MADE BY ASSE DATE 18/01/00 APPR BY PLANQUE DATE 18/01/99
REV PCN XXXXXXXX DESCRIPTION XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
MADE BY NAME DATE DD/MM/YY APPR BY NAME DATE DD/MM/YY
MADE ASSE DATE 07/05/98
CHECK BAPTISTE DATE 07/05/98
APPR CASTEIGNAU DATE 07/05/98
OTHER NAME DATE DD/MM/YY
BLOCK SHT 17 OF 17
GE Medical Systems
BUC - FRANCE
DESIGN TITLE KV_CTRL_V2C
FIRST MADE FOR JEDI
DRAWING NO. 2210229-2SCH
REV A
SIZE 3
SHT/CONT. ON 17 / 17

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SECTION 3

JEDI GENERATOR CENTRAL LISTING

3-1 kV MEASURE BOARD

CAUTION **This board forms part of the oil seal of the High Voltage Tank. It can only be removed at the factory. The Field Replaceable Unit (FRU) is the complete HV Tank.**

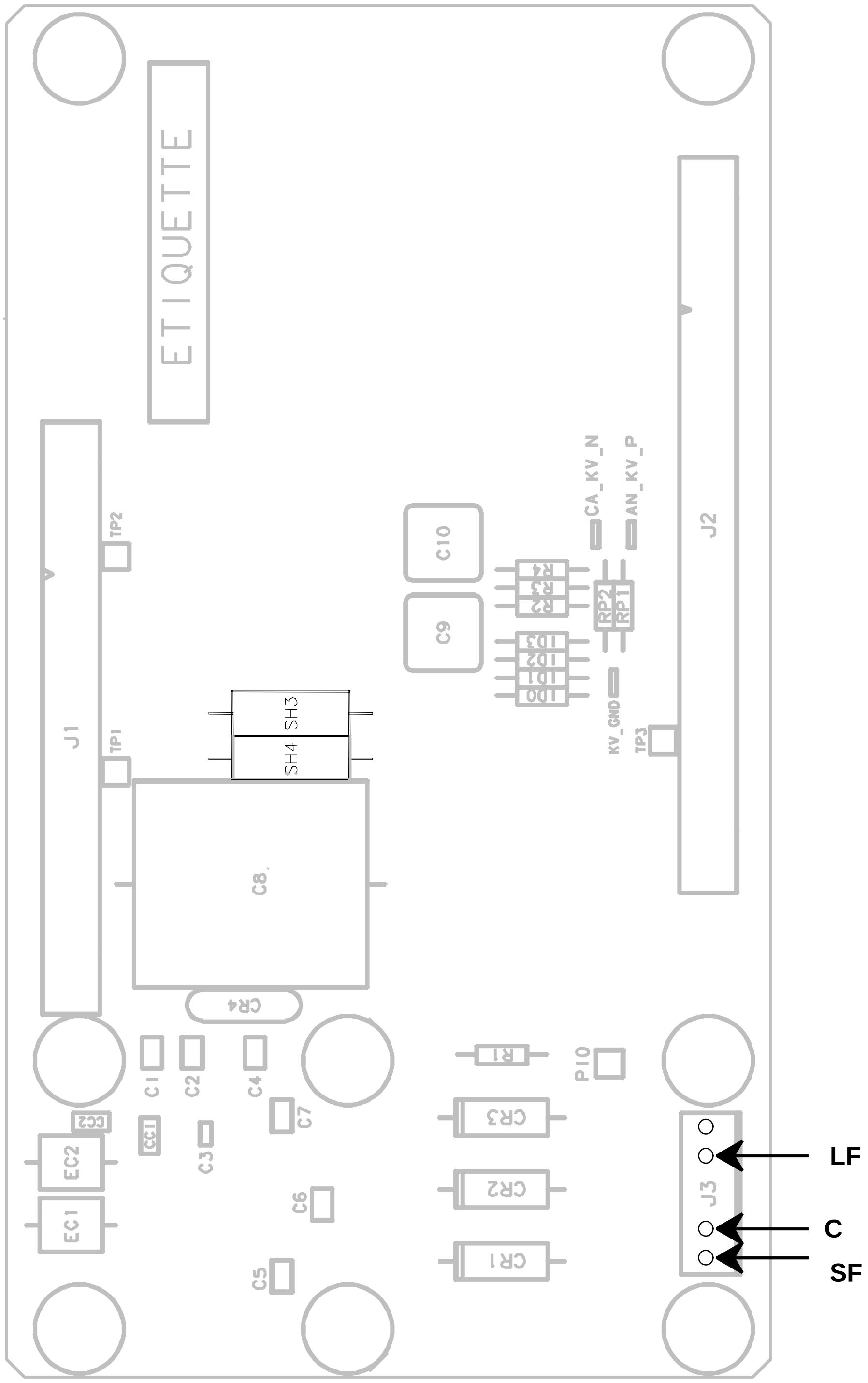
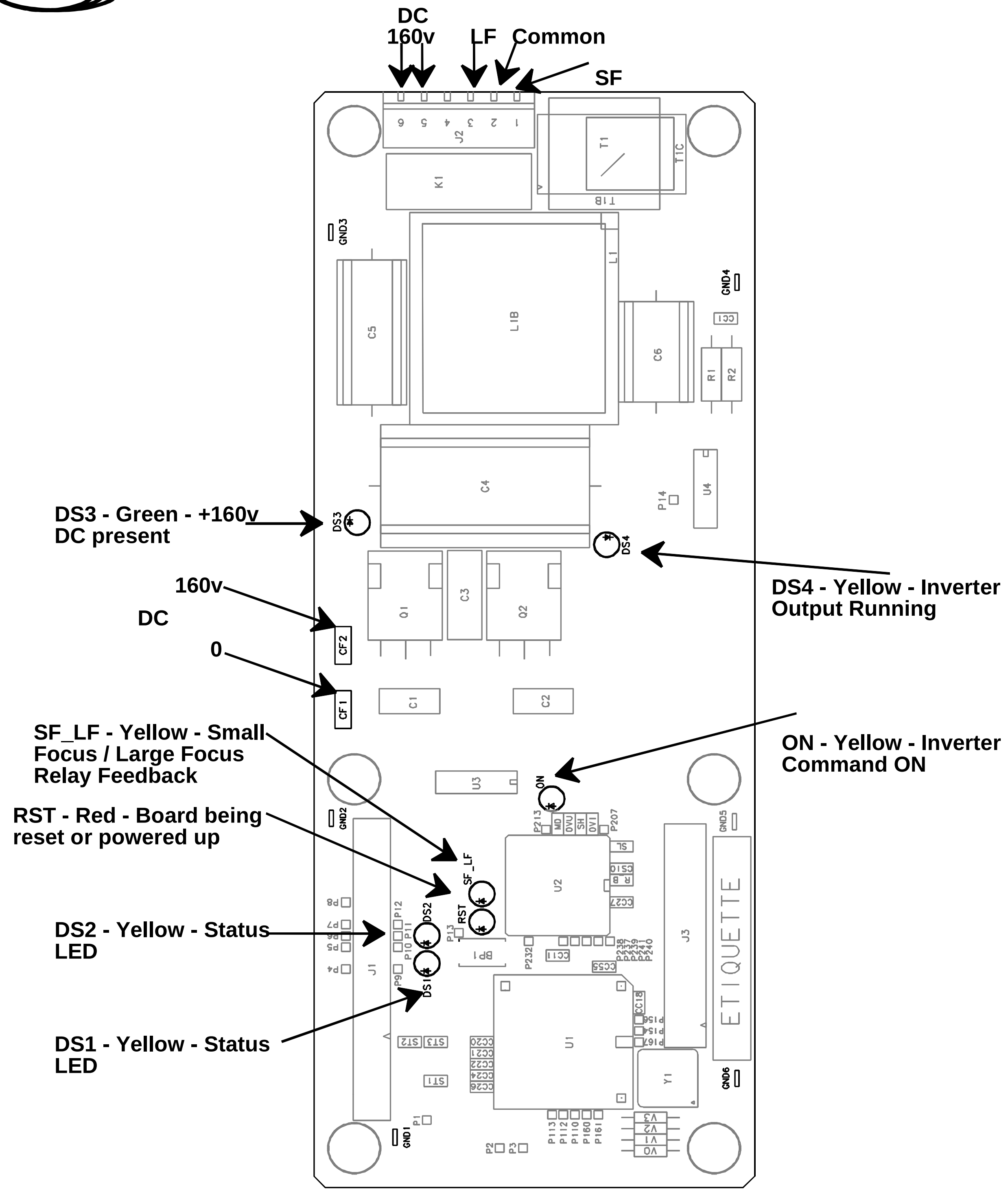

ETIQUETTE
J1
J2
J3
TP1
TP2
TP3
C10
C9
R4
R3
R2
ID3
ID2
ID1
ID0
RP2
RP1
CA_KV_N
AN_KV_P
KV_GND
SH3
SH4
C8
CR4
C1
C2
C4
R1
P10
C7
CC2
CC1
C3
EC2
EC1
C6
C5
CR3
CR2
CR1
LF
C
SF

Illustration - kV Measure Board

3-2 FILAMENT BOARD 1 INV.

DANGER **HIGH VOLTAGE: DO NOT GO INTO GENERATOR UNTIL INDICATOR DS3 GOES OUT.**



DC 160v

LF

Common

SF

DS3 - Green - +160v DC present

160v DC 0

DS4 - Yellow - Inverter Output Running

SF_LF - Yellow - Small Focus / Large Focus Relay Feedback

ON - Yellow - Inverter Command ON

RST - Red - Board being reset or powered up

DS2 - Yellow - Status LED

DS1 - Yellow - Status LED

6 5 4 3 2 1
J2
K1
T1
T1B
T1C
GND3
L1
L1B
C5
C6
GND4
CC1
R1
R2
C4
P14
U4
DS3
DS4
Q1
C3
Q2
CF2
CF1
C1
C2
U3
ON
GND2
GND5
P213
MD
OVU
SH
OVI
P207
SL
CS10
R B
CC27
U2
SF_LF
RST
DS2
DS1
P8
P7
P6
P5
P4
P12
P11
P10
P9
P13
BP1
P232
CC11
CC55
P238
P237
P239
P241
P240
J1
J3
ETIQUETTE
CC18
P156
P154
P167
U1
Y1
GND6
ST3
ST2
ST1
CC20
CC21
CC22
CC24
CC26
P1
GND1
P2
P3
P113
P112
P110
P160
P161
V3
V2
V1
V0

Illustration - Filament Board 1 Inv.

3-3 ROTATION BOARD HIGH SPEED

DANGER **HIGH VOLTAGE: DO NOT GO INTO GENERATOR UNTIL INDICATOR DS6 AND DS7 (NEON-ORANGE) GO OUT.**

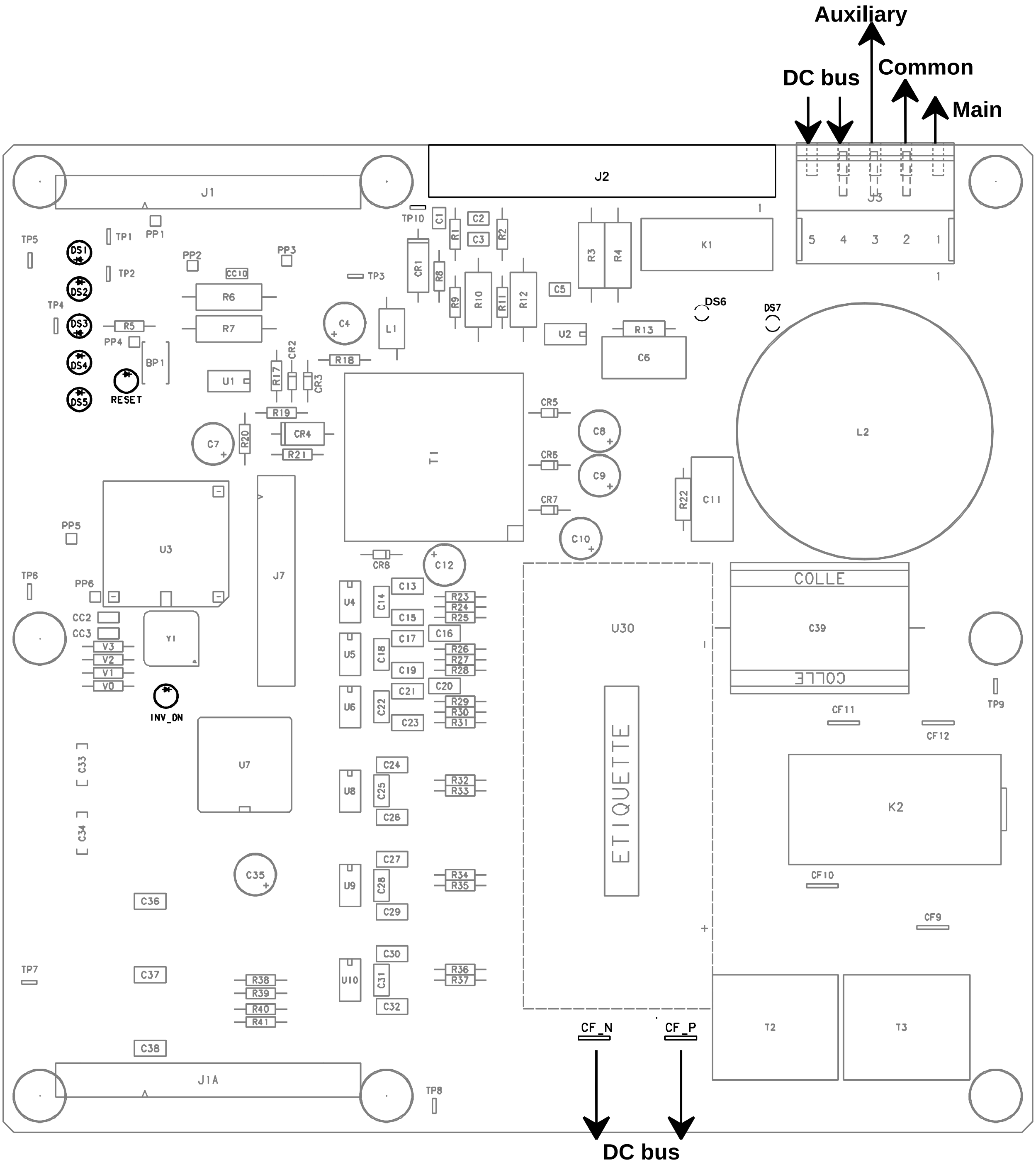
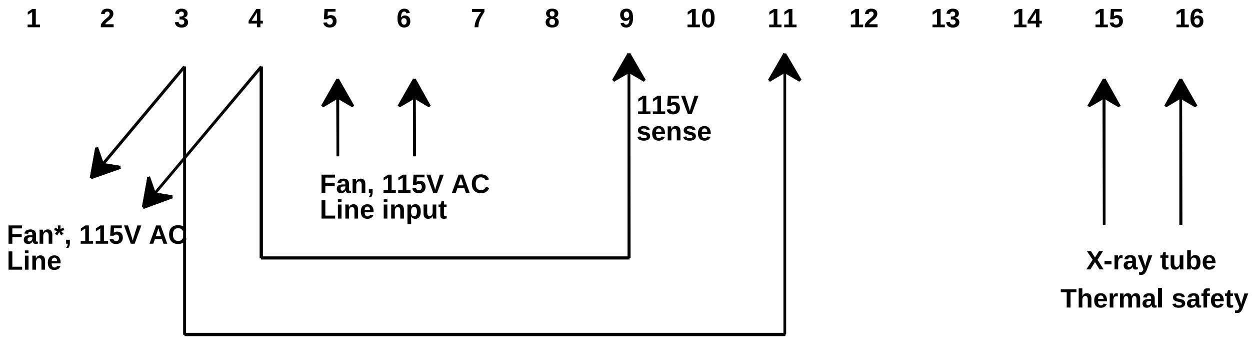

Auxiliary
DC bus
Common
Main
J1
J2
J3
5 4 3 2 1
K1
TP10
TP5
TP1
PP1
PP2
PP3
TP2
TP3
TP4
DS1
DS2
DS3
DS4
DS5
RESET
CC10
R6
R7
R5
PP4
BP1
U1
C4
L1
CR1
R8
R9
R10
R11
R12
C1
R1
C2
C3
R2
R3
R4
C5
U2
R13
C6
DS6
DS7
L2
R17
CR2
CR3
R18
R19
CR4
R20
R21
C7
T1
CR5
C8
CR6
C9
CR7
C10
R22
C11
PP5
U3
J7
TP6
PP6
CC2
CC3
Y1
V3
V2
V1
V0
INV_ON
CR8
C12
C13
U4
C14
C15
R23
R24
R25
C16
C17
U5
C18
C19
R26
R27
R28
C20
C21
U6
C22
C23
R29
R30
R31
U30
COLLE
C39
TP9
CF11
CF12
ETIQUETTE
U7
C33
C34
C24
U8
C25
C26
R32
R33
K2
CF10
C35
C36
C27
U9
C28
C29
R34
R35
CF9
TP7
C37
C30
U10
C31
C32
R36
R37
R38
R39
R40
R41
C38
J1A
TP8
CF_N
CF_P
T2
T3
DC bus

Illustration - Rotation Board High Speed

3-3-1 Indicators

INDICATOR	COLOR	INDICATES:
RESET	Red	BOARD BEING RESET OR POWERED UP
INV_ON	Yellow	THE INVERTER IS RUNNING
DS1	Green	PRESENCE OF +15 V SUPPLY
DS2	Green	PRESENCE OF -15 V SUPPLY
DS3	Green	PRESENCE OF +5 V SUPPLY
DS4-DS5	Yellow	BOARD STATUS
DS6	Neon (orange)	FAN VAC POWER SUPPLY PRESENT
DS7	Neon (orange)	DC BUS PRESENT

3-3-2 J2 Wiring


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
115V sense
Fan, 115V AC Line input
Fan*, 115V AC Line
X-ray tube Thermal safety

* used in application with fan cooling

3-4 LV POWER SUPPLY 3 PH BOARD

DANGER **HIGH VOLTAGE AND HOT SURFACE: DO NOT TOUCH BOARD UNTIL INDICATOR NE1 (NEON - ORANGE) GOES OUT.**

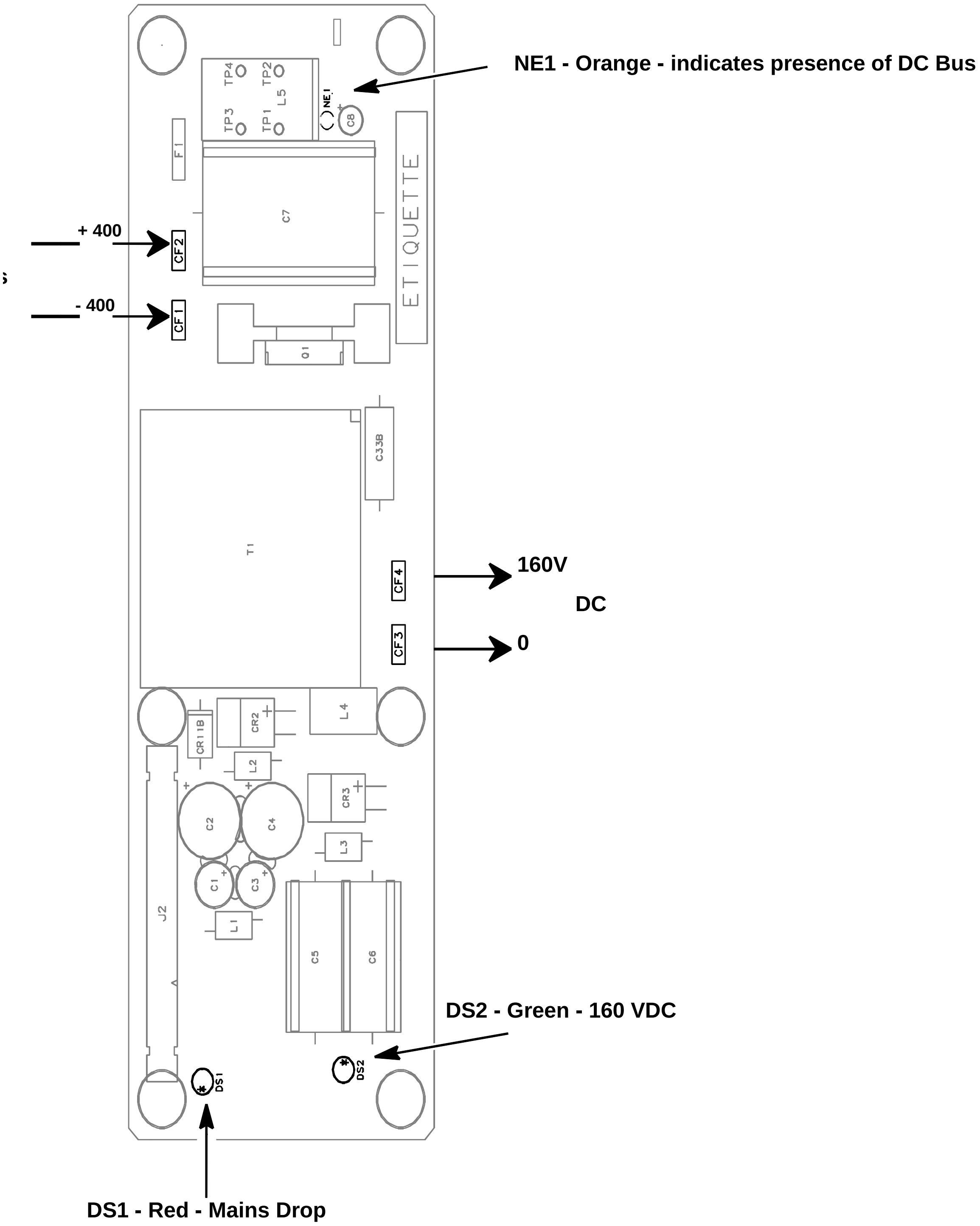
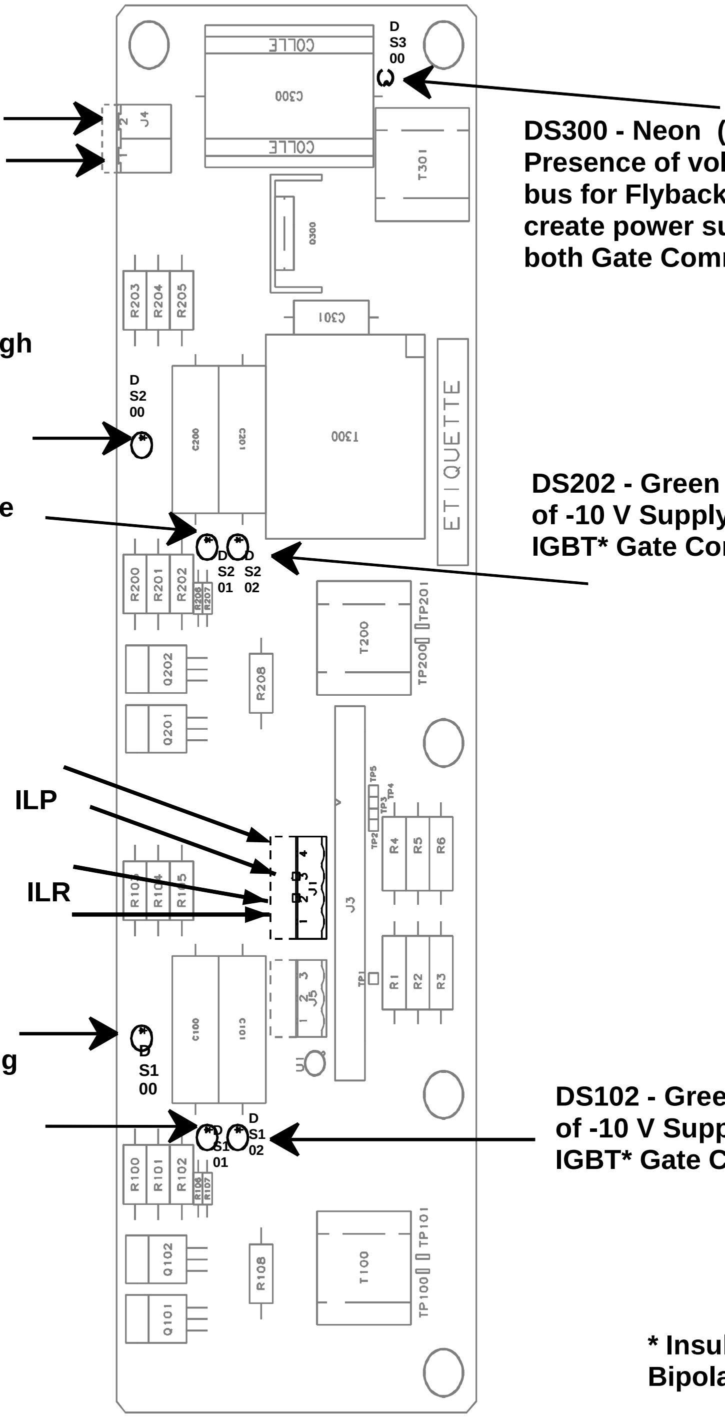

NE1 - Orange - indicates presence of DC Bus
TP4
TP2
TP3
TP1
L5
NE1
C8
F1
C7
ETIQUETTE
+ 400
CF2
- 400
CF1
Q1
C33B
T1
CF4
160V
DC
CF3
0
L4
CR11B
CR2
L2
CR3
C2
C4
C1
C3
L3
L1
J2
C5
C6
DS2 - Green - 160 VDC
DS2
DS1
DS1 - Red - Mains Drop

Illustration 4 - LV Power Supply 3 Ph Board

3-5 GATE COMMAND BOARD

DANGER **HIGH VOLTAGE: DO NOT TOUCH BOARD UNTIL DS300 ON THIS BOARD AND DS1 ON DUAL SNUB BOARD ARE OUT.**

CAUTION **Hot surface on transformer T300 and heat sink.**


DS300
J4
C300
COLLE
T301
Q300
R203
R204
R205
C301
DS200
C200
C201
T300
ETIQUETTE
DS201
DS202
R200
R201
R202
R206
R207
T200
TP200
TP201
Q202
Q201
R208
TP2
TP3
TP4
TP5
R4
R5
R6
J1
J3
R103
R104
R105
TP1
R1
R2
R3
J5
C100
C101
U1
DS100
DS101
DS102
R100
R101
R102
R106
R107
Q102
Q101
R108
T100
TP100
TP101

DC bus

DS300 - Neon (Orange) - Presence of voltage on DC bus for Flyback Converter to create power supplies for both Gate Commands

DS200 - Yellow - High IGBT* (Q200) Gate Command running

DS201 - Green - Presence of +20 V Supply on high IGBT* Gate Command

DS202 - Green - Pres ence of -10 V Supply on high IGBT* Gate Command

Inverter current feedback

ILP

ILR

DS100 -Yellow-Low IGBT* (Q100) Gate Command running

DS101 - Green - Presence of +20 V Supply on low IGBT* Gate Command

DS102 - Green - Presence of -10 V Supply on low IGBT* Gate Command

*** Insulated Gate Bipolar Transistor**

Illustration - Gate Command Board

6 kV CONTROL BOARD

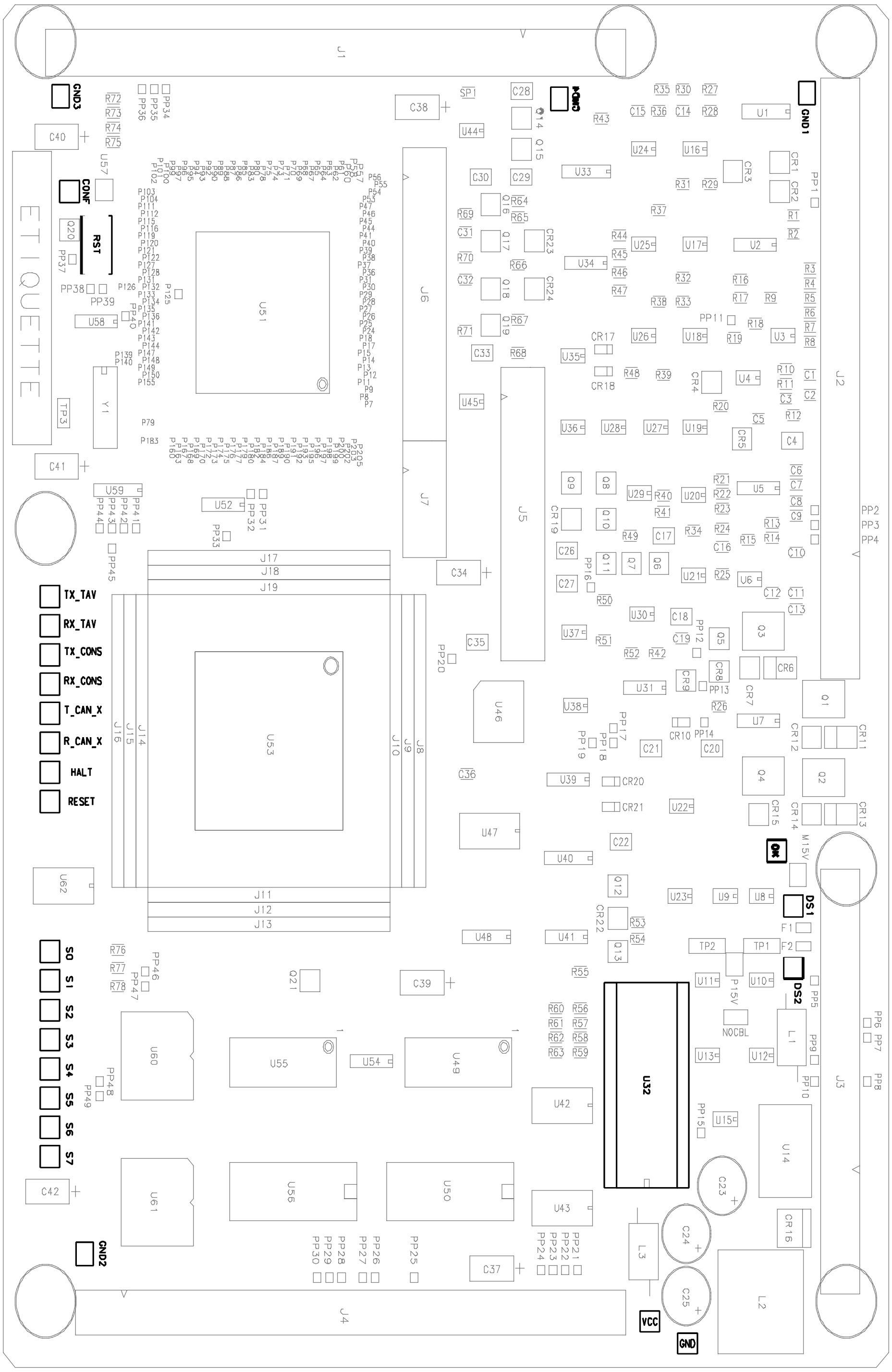

J1
GND3
CONF
RST
ETIQUETTE
C40
C41
C38
C28
SP1
GND1
U1
U57
U51
U58
Y1
TP3
J6
J7
J5
J2
J3
J4
J17
J18
J19
J11
J12
J13
J14
J15
J16
J8
J9
J10
U53
U46
U47
U48
U52
U59
C34
C35
C36
C37
C39
C42
TX_TAV
RX_TAV
TX_CONS
RX_CONS
T_CAN_X
R_CAN_X
HALT
RESET
U62
S0
S1
S2
S3
S4
S5
S6
S7
U60
U61
U55
U54
U49
U56
U50
U42
U43
U32
GND2
VCC
GND
L1
L2
L3
C23
C24
C25
U14
CR16
DS1
DS2
F1
F2
TP1
TP2
NOCBL
OK
M15V
P15V
Q1
Q2
Q3
Q4
U33
U34
U35
U36
U37
U38
U39
U40
U41
U44
U45
PP2
PP3
PP4
PP6
PP7
PP8

Illustration - kV Control Board

3-6-1 Switches and Jumpers

SWITCH OR JUMPER	FUNCTION
RST	RESET PUSH BUTTON

3-6-2 Indicators

INDICATOR	COLOR	INDICATES:
CONF	Red	FIELD PROGRAMMABLE GATE ARRAY (FPGA) CONFIGURATION NOT ACCOMPLISHED
OK	Yellow	INVERTER GATE POWER SUPPLY OK
TX_TAV	Yellow	TRANSMIT TO SERVICE LAPTOP
RX_TAV	Yellow	RECEIVE FROM SERVICE LAPTOP
TX_CONS	Yellow	TRANSMIT TO CONSOLE (IF EXISTING)
RX_CONS	Yellow	RECEIVE FROM CONSOLE (IF EXISTING)
T_CAN_X	Yellow	SYSTEM CAN BUS TRANSMIT
R_CAN_X	Yellow	SYSTEM CAN BUS RECEIVE
HALT	Red	MICROPROCESSOR HALTED
RESET	Red	BOARD BEING RESET
S0 TO S7	Yellow	STATUS LED IN APPLICATION MODE THESE LEDS FLASH IN SEQUENCE CONTINUOUSLY
DS1	Green	-15V SUPPLY
DS2	Green	+15V SUPPLY

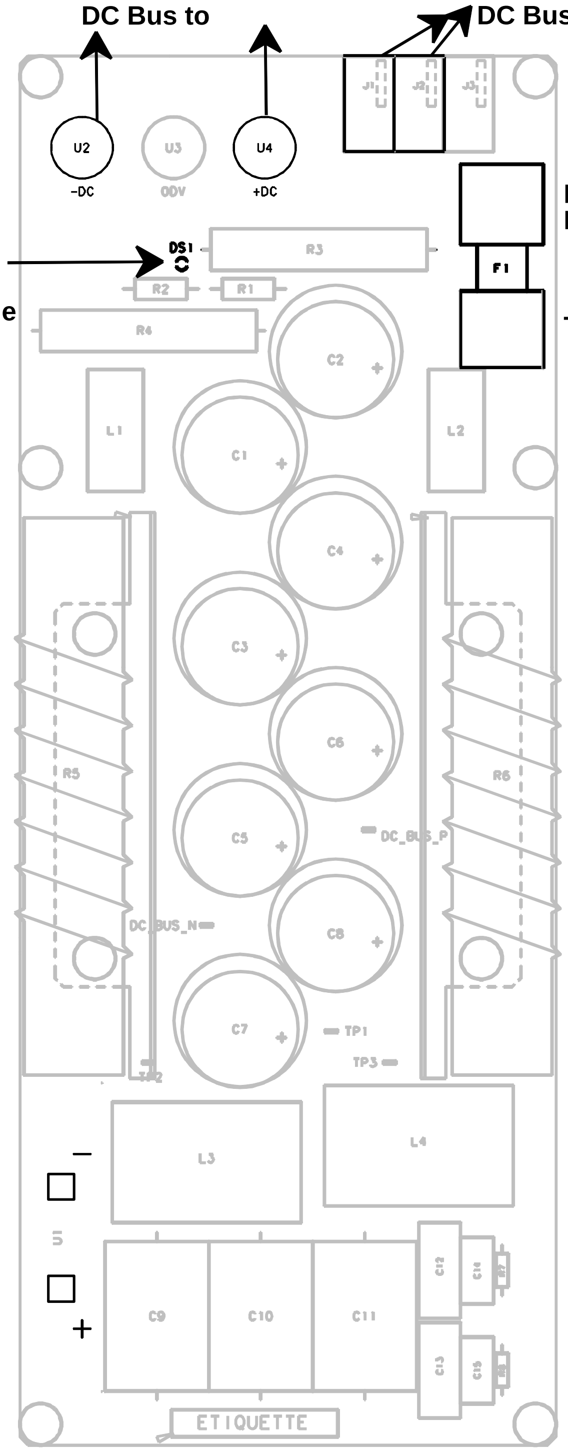
3-6-3 Non Volatile RAM

REFERENCE	DESIGNATION
U32	NON VOLATILE PARAMETERS RAM (BATTERY INCLUDED)

3-7 AC/DC 3 PHASE BOARD

DANGER **HIGH VOLTAGE: DO NOT GO INTO GENERATOR UNTIL DS1 (NEON - ORANGE) GOES OUT.**

CAUTION **Some components on this board can become very hot.**


U2
U3
U4
-DC
0DV
+DC
J1
J2
J3
DS1
R3
R2
R1
R4
F1
C2
L1
C1
L2
C4
C3
C6
R5
R6
C5
DC_BUS_P
DC_BUS_N
C8
C7
TP1
TP3
TP2
L3
L4
−
U1
+
C9
C10
C11
C12
C14
C13
C15
ETIQUETTE

DC Bus to

DC Bus out

DS1 - Neon (Orange) - Indicates presence of voltage on the DC Bus.

F1 - Fuse -
Protects (on DC Bus):
LV Power Supply 3 Phase Board
Rotor Board High Speed
Gate Command Board
Type: 15 A, 600 VDC

Illustration - AC/DC 3 Phase Board

3-8 I/F BOARD RAD V2

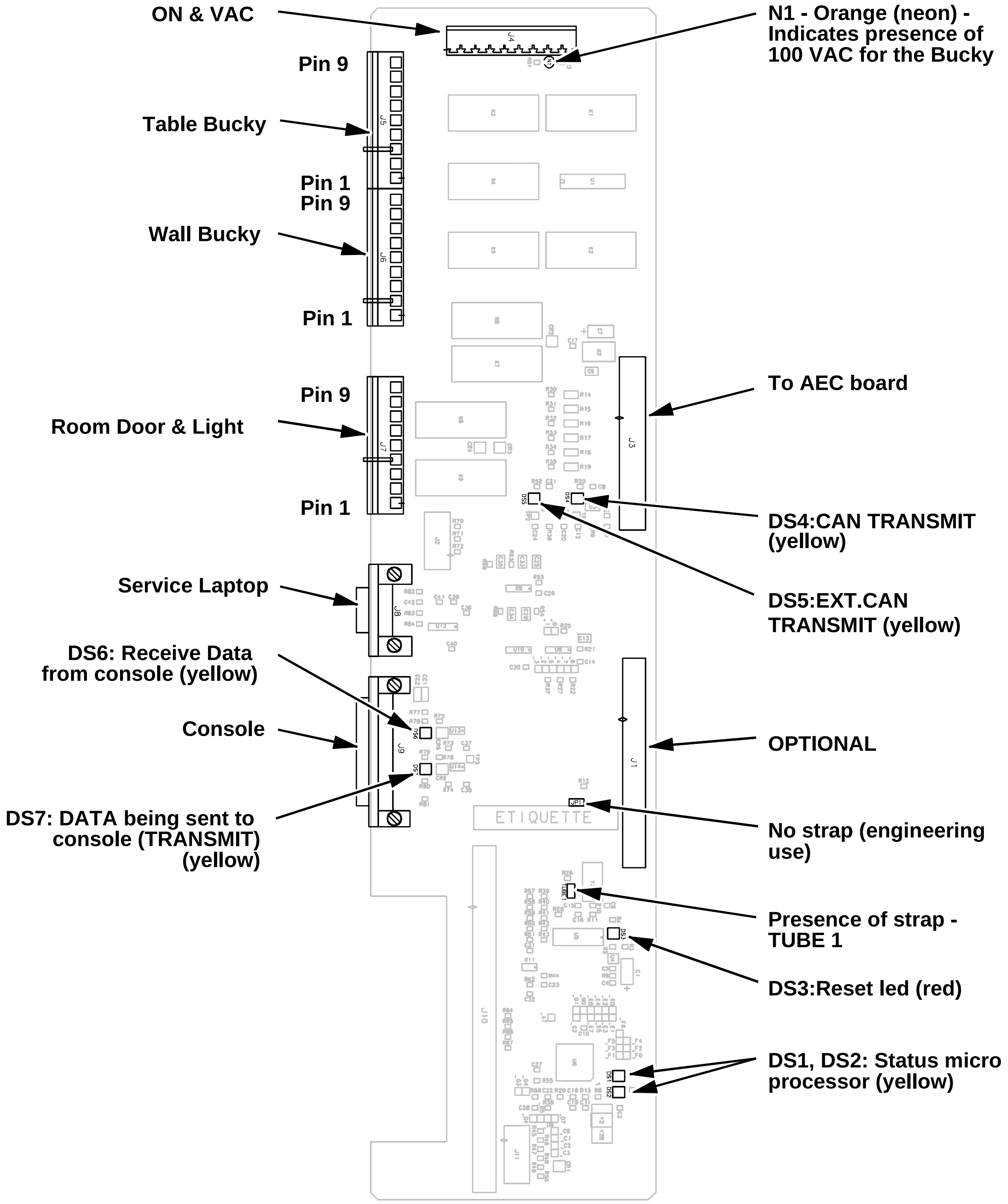
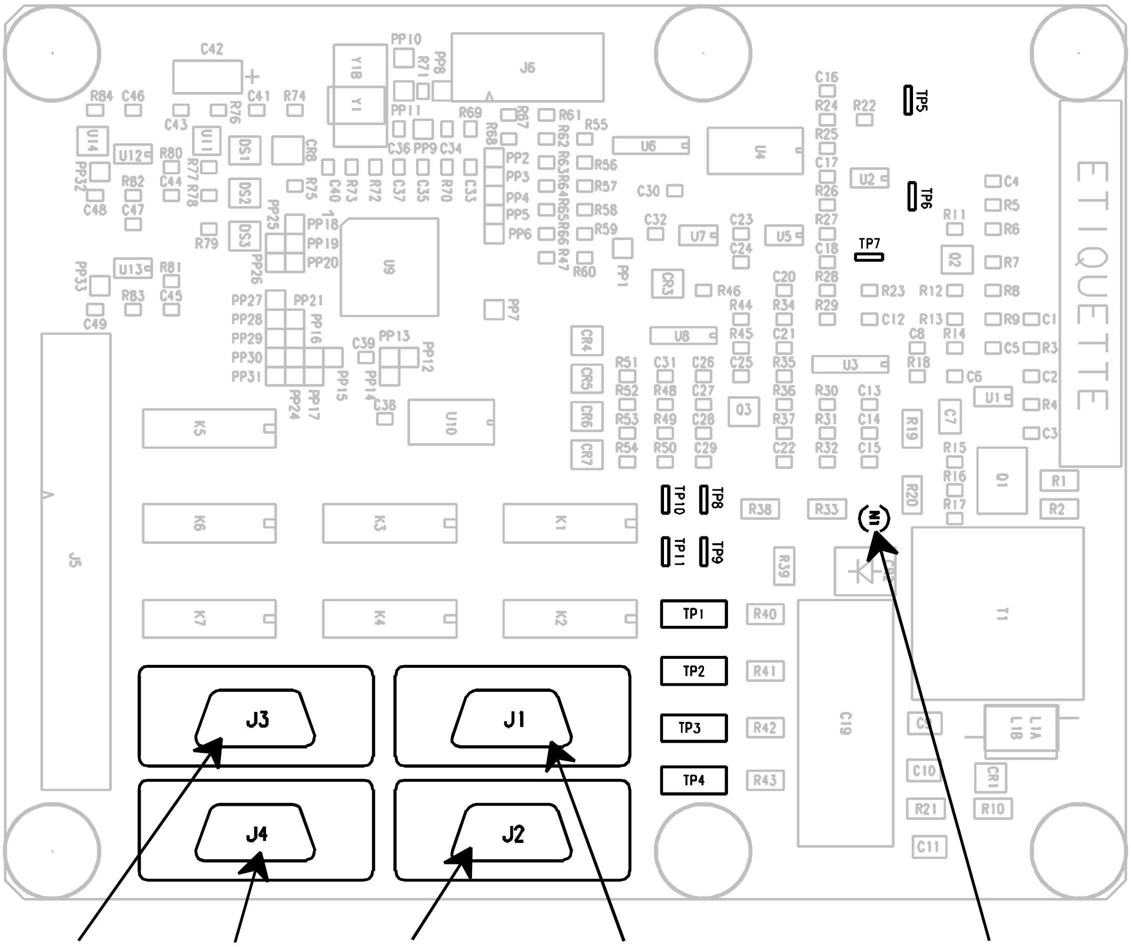

ON & VAC
N1 - Orange (neon) - Indicates presence of 100 VAC for the Bucky
Pin 9
Table Bucky
Pin 1
Pin 9
Wall Bucky
Pin 1
To AEC board
Pin 9
Room Door & Light
Pin 1
DS4:CAN TRANSMIT (yellow)
Service Laptop
DS5:EXT.CAN TRANSMIT (yellow)
DS6: Receive Data from console (yellow)
Console
OPTIONAL
DS7: DATA being sent to console (TRANSMIT) (yellow)
No strap (engineering use)
ETIQUETTE
Presence of strap - TUBE 1
DS3:Reset led (red)
DS1, DS2: Status micro processor (yellow)

Illustration - I/F Board RAD V2

3-9 AEC BOARD V2


J3
J1
J4
J2
J5
J6
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
N1
T1
C19
ETIQUETTE

AEC4 **AEC3** **AEC1** **AEC2** **N1 - Orange (neon) - Presence of 230 VDC**

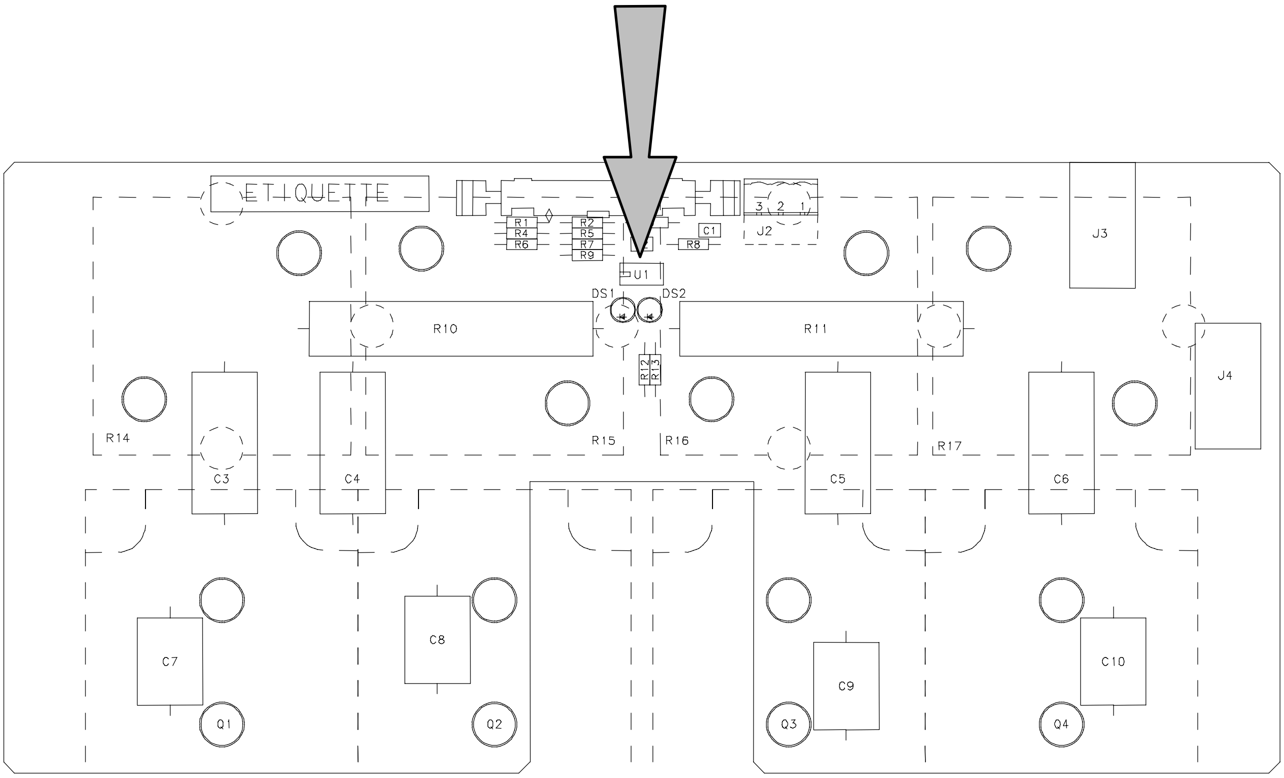
Illustration - AEC Board V2

3-9-1 Test Points

TESTPOINT	MEASUREMENT	
	SIGNAL	RANGE
TP1	230 VDC	230 VDC _5%
TP2	230 VDC	230 VDC _5%
TP3	230 VDC	230 VDC _5%
TP4	230 VDC	230 VDC _5%
TP5	AEC assignment reference	0 to 10 V
TP6	10 VDC (reference)	10 VDC _1%
TP7	AEC return voltage	
TP8	AEC1 return voltage	
TP9	AEC2 return voltage	
TP10	AEC3 return voltage	
TP11	AEC4 return voltage	

3-10 QUAD SNUB BOARD

DANGER **HIGH VOLTAGE: DO NOT GO INTO GENERATOR UNTIL INDICATOR DS1 (NEON - ORANGE) GOES OUT.**

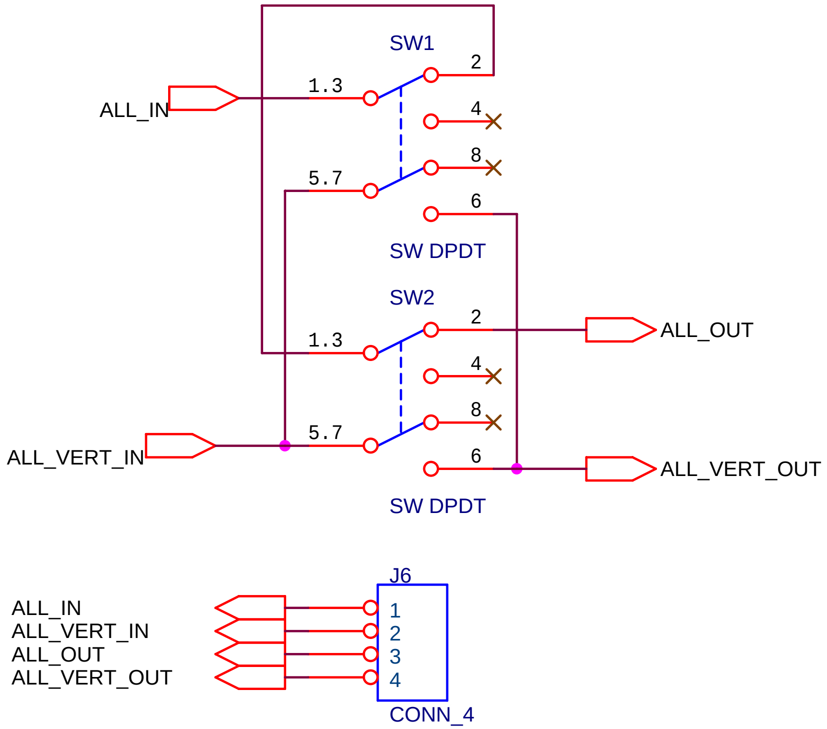

DS1 / DS2 - LED (green) - Indicates presence of voltage on DC Bus

ETIQUETTE
R1
R4
R6
R2
R5
R7
R9
C1
R8
3 2 1
J2
J3
U1
DS1
DS2
R10
R11
R12
R13
J4
R14
R15
R16
R17
C3
C4
C5
C6
C7
C8
C9
C10
Q1
Q2
Q3
Q4

Illustration - Quad Snub Board

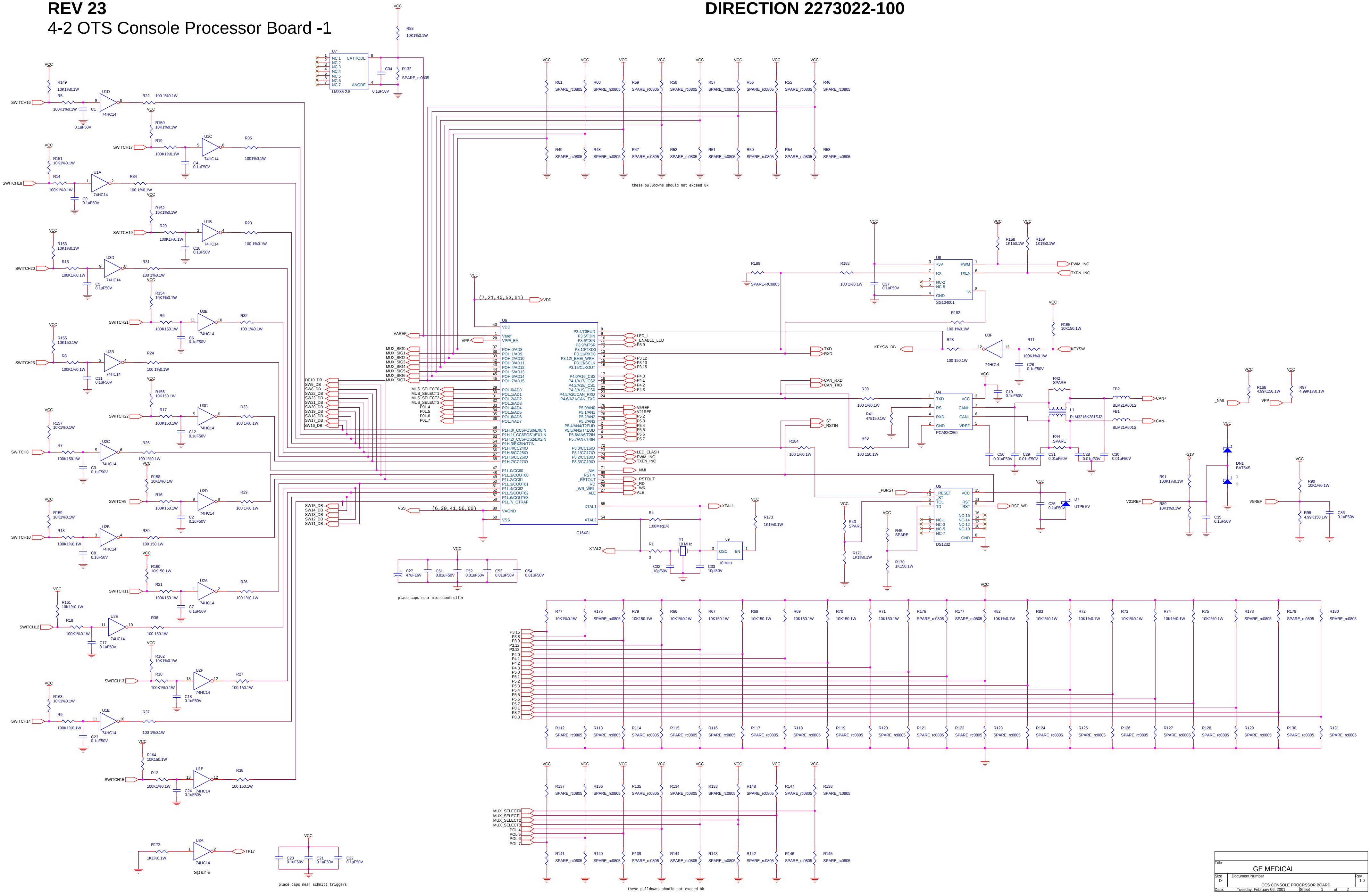
SECTION 4 OTS CONSOLE ILLUSTRATIONS

4-1 Release Handle Schematics

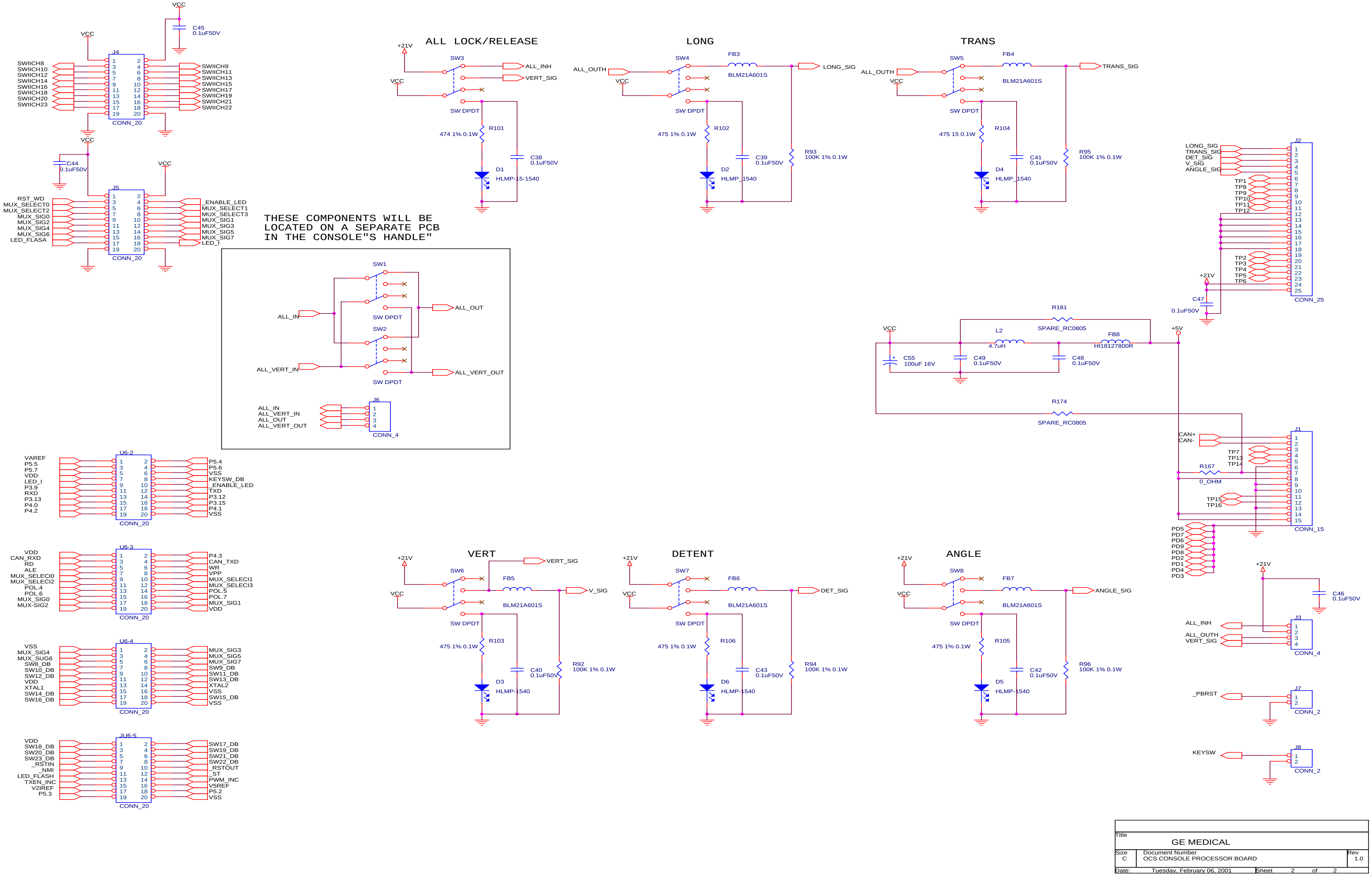

SW1
ALL_IN
1.3
2
4
8
5.7
6
SW DPDT
SW2
1.3
2
ALL_OUT
4
8
ALL_VERT_IN
5.7
6
ALL_VERT_OUT
SW DPDT
J6
ALL_IN
ALL_VERT_IN
ALL_OUT
ALL_VERT_OUT
1
2
3
4
CONN_4

Title ALL LOCK/RELEASE HANDLE		
Size A	Document Number WDS-105-C-001	Rev
Date: Saturday, May 27, 2000	Sheet 1 of 1	

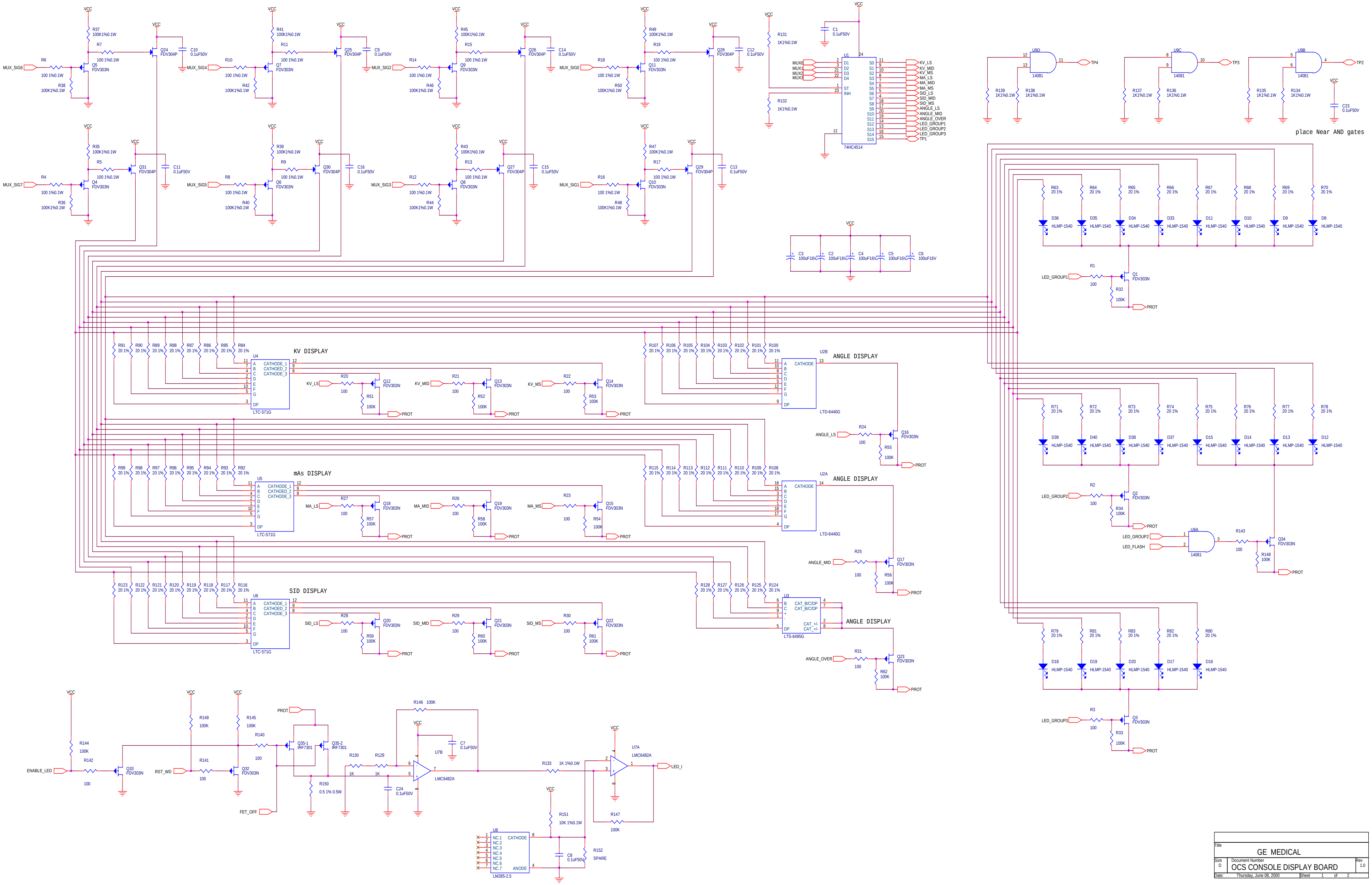
4-2 OTS Console Processor Board -1


VCC
R88 10K1%0.1W
U7 LM285-2.5
CATHODE
ANODE
C34 0.1uF50V
R132 SPARE_rc0805
SWITCH16
SWITCH17
SWITCH18
SWITCH19
SWITCH20
SWITCH21
SWITCH23
SWITCH22
SWITCH8
SWITCH9
SWITCH10
SWITCH11
SWITCH12
SWITCH13
SWITCH14
SWITCH15
74HC14
these pulldowns should not exceed 8k
(7,21,40,53,61) VDD
(6,20,41,56,60)
VAREF
VPP
VSS
U6 C164CI
XTAL1
XTAL2
MUS_SIG0
MUS_SIG1
MUS_SIG2
MUS_SIG3
MUS_SIG4
MUS_SIG5
MUS_SIG6
MUS_SIG7
MUS_SELECT0
MUS_SELECT1
MUS_SELECT2
MUS_SELECT3
POL.4
POL.5
POL.6
POL.7
DE10_DB
SW9_DB
SW8_DB
SW22_DB
SW23_DB
SW21_DB
SW20_DB
SW19_DB
SW18_DB
SW17_DB
SW16_DB
SW15_DB
SW14_DB
SW13_DB
SW12_DB
SW11_DB
LED_I
_ENABLE_LED
TXD
RXD
CAN_RXD
CAN_TXD
_ST
_RSTIN
LED_ELASH
PWM_INC
TXEN_INC
_NMI
_RSTOUT
_RD
_WR
ALE
U8 SG104001
PWM_INC
TXEN_INC
KEYSW_DB
KEYSW
U3F
U4 PCA82C250
CAN+
CAN-
L1 PLM3216K281SJ2
FB1 BLM21A601S
FB2 BLM21A601S
U5 DS1232
RST_WD
_PBRST
D7 UTP5.5V
DN1 BAT54S
V21REF
V5REF
+21V
Y1 10 MHz
U9 OSC 10 MHz
place caps near microcontroller
U3A 74HC14
TP17
spare
place caps near schmitt triggers
these pulldowns should not exceed 8k
Title
GE MEDICAL
Size D
Document Number
OCS CONSOLE PROCRSSOR BOARD
Rev 1.0
Date: Tuesday, February 06, 2001
Sheet 1 of 2

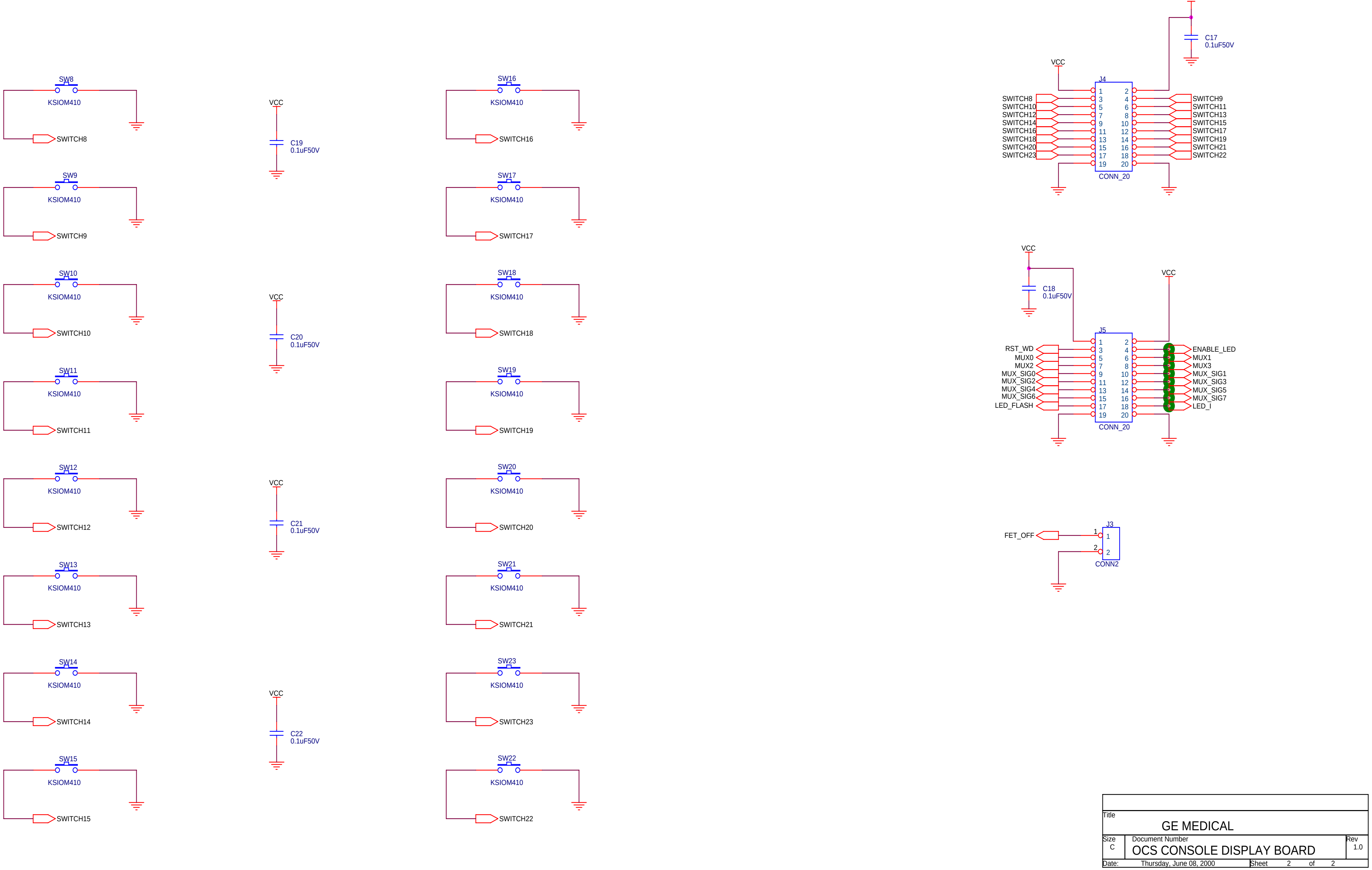
4-3 OTS Console Processor Board -2


VCC
C45
0.1uF50V
J4
SWIICH8
SWIICH10
SWIICH12
SWIICH14
SWIICH16
SWIICH18
SWIICH20
SWIICH23
SWIICH9
SWIICH11
SWIICH13
SWIICH15
SWIICH17
SWIICH19
SWIICH21
SWIICH22
CONN_20
C44
0.1uF50V
J5
RST_WD
MUX_SELECT0
MUX_SELECT2
MUX_SIG0
MUX_SIG2
MUX_SIG4
MUX_SIG6
LED_FLASA
_ENABLE_LED
MUX_SELECT1
MUX_SELECT3
MUX_SIG1
MUX_SIG3
MUX_SIG5
MUX_SIG7
LED_I
ALL LOCK/RELEASE
+21V
SW3
ALL_INH
VERT_SIG
SW DPDT
R101
474 1% 0.1W
C38
0.1uF50V
D1
HLMP-15-1540
LONG
ALL_OUTH
SW4
FB3
BLM21A601S
LONG_SIG
R102
475 1% 0.1W
C39
0.1uF50V
R93
100K 1% 0.1W
D2
HLMP_1540
TRANS
SW5
FB4
TRANS_SIG
R104
475 15 0.1W
C41
0.1uF50V
R95
100K 1% 0.1W
D4
HLMP_1540
THESE COMPONENTS WILL BE LOCATED ON A SEPARATE PCB IN THE CONSOLE"S HANDLE"
SW1
ALL_IN
ALL_OUT
SW2
ALL_VERT_IN
ALL_VERT_OUT
J6
ALL_IN
ALL_VERT_IN
ALL_OUT
ALL_VERT_OUT
CONN_4
J2
LONG_SIG
TRANS_SIG
DET_SIG
V_SIG
ANGLE_SIG
TP1
TP8
TP9
TP10
TP11
TP12
TP2
TP3
TP4
TP5
TP6
C47
0.1uF50V
CONN_25
R181
SPARE_RC0805
+5V
L2
4.7uH
FB8
HI1812780OR
C55
100uF 16V
C49
0.1uF50V
C48
0.1uF50V
R174
SPARE_RC0805
J1
CAN+
CAN-
TP7
TP13
TP14
R167
0_OHM
TP15
TP16
CONN_15
PD5
PD7
PD6
PD9
PD8
PD2
PD1
PD4
PD3
U6-2
VAREF
P5.5
P5.7
VDD
LED_I
P3.9
RXD
P3.13
P4.0
P4.2
P5.4
P5.6
VSS
KEYSW_DB
_ENABLE_LED
TXD
P3.12
P3.15
P4.1
VSS
U6-3
VDD
CAN_RXD
RD
ALE
MUX_SELECI0
MUX_SELECI2
POL.4
POL.6
MUX_SIG0
MUX-SIG2
P4.3
CAN_TXD
WR
VPP
MUX_SELECI1
MUX_SELECI3
POL.5
POL.7
MUX_SIG1
VDD
U6-4
VSS
MUX_SIG4
MUX_SUG6
SW8_DB
SW10_DB
SW12_DB
VDD
XTAL1
SW14_DB
SW16_DB
MUX_SIG3
MUX_SIG5
MUX_SIG7
SW9_DB
SW11_DB
SW13_DB
XTAL2
VSS
SW15_DB
VSS
JU6-5
VDD
SW18_DB
SW20_DB
SW23_DB
_RSTIN
_NMI
LED_FLASH
TXEN_INC
V2IREF
P5.3
SW17_DB
SW19_DB
SW21_DB
SW22_DB
_RSTOUT
_ST
PWM_INC
V5REF
P5.2
VSS
VERT
SW6
FB5
V_SIG
R103
475 1% 0.1W
C40
0.1uF50V
R92
100K 1% 0.1W
D3
HLMP-1540
DETENT
SW7
FB6
DET_SIG
R106
475 1% 0.1W
C43
0.1uF50V
R94
100K 1% 0.1W
D6
HLMP-1540
ANGLE
SW8
FB7
ANGLE_SIG
R105
475 1% 0.1W
C42
0.1uF50V
R96
100K 1% 0.1W
D5
HLMP-1540
C46
0.1uF50V
J3
ALL_INH
ALL_OUTH
VERT_SIG
CONN_4
J7
_PBRST
CONN_2
J8
KEYSW
CONN_2
Title
GE MEDICAL
Size
C
Document Number
OCS CONSOLE PROCESSOR BOARD
Rev
1.0
Date:
Tuesday, February 06, 2001
Sheet
2
of
2

4-4 OTS Console Display Board -1


KV DISPLAY
mAs DISPLAY
SID DISPLAY
ANGLE DISPLAY
ANGLE DISPLAY
ANGLE DISPLAY
place Near AND gates
U4 LTC-571G
U5 LTC-571G
U6 LTC-571G
U2B LTD-6440G
U2A LTD-6440G
U3 LTS-6495G
U1 74HC4514
U9D 14081
U9C 14081
U9B 14081
U9A 14081
U7A LMC6482A
U7B LMC6482A
U8 LM285-2.5
MUX_SIG0
MUX_SIG1
MUX_SIG2
MUX_SIG3
MUX_SIG4
MUX_SIG5
MUX_SIG6
MUX_SIG7
KV_LS
KV_MID
KV_MS
MA_LS
MA_MID
MA_MS
SID_LS
SID_MID
SID_MS
ANGLE_LS
ANGLE_MID
ANGLE_OVER
LED_GROUP1
LED_GROUP2
LED_GROUP3
LED_FLASH
ENABLE_LED
RST_WD
FET_OFF
LED_I
PROT
VCC
TP1
TP2
TP3
TP4
HLMP-1540
FDV303N
FDV304P
IRF7301
GE MEDICAL
OCS CONSOLE DISPLAY BOARD
Size D
Rev 1.0
Date: Thursday, June 08, 2000
Sheet 1 of 2

4-5 OTS Console Display Board –2


VCC
C17
0.1uF50V
VCC
J4
SWITCH8
SWITCH10
SWITCH12
SWITCH14
SWITCH16
SWITCH18
SWITCH20
SWITCH23
SWITCH9
SWITCH11
SWITCH13
SWITCH15
SWITCH17
SWITCH19
SWITCH21
SWITCH22
CONN_20
SW8
KSIOM410
SWITCH8
SW9
KSIOM410
SWITCH9
SW10
KSIOM410
SWITCH10
SW11
KSIOM410
SWITCH11
SW12
KSIOM410
SWITCH12
SW13
KSIOM410
SWITCH13
SW14
KSIOM410
SWITCH14
SW15
KSIOM410
SWITCH15
VCC
C19
0.1uF50V
VCC
C20
0.1uF50V
VCC
C21
0.1uF50V
VCC
C22
0.1uF50V
SW16
KSIOM410
SWITCH16
SW17
KSIOM410
SWITCH17
SW18
KSIOM410
SWITCH18
SW19
KSIOM410
SWITCH19
SW20
KSIOM410
SWITCH20
SW21
KSIOM410
SWITCH21
SW23
KSIOM410
SWITCH23
SW22
KSIOM410
SWITCH22
VCC
C18
0.1uF50V
VCC
J5
RST_WD
MUX0
MUX2
MUX_SIG0
MUX_SIG2
MUX_SIG4
MUX_SIG6
LED_FLASH
ENABLE_LED
MUX1
MUX3
MUX_SIG1
MUX_SIG3
MUX_SIG5
MUX_SIG7
LED_I
CONN_20
FET_OFF
J3
CONN2
Title
GE MEDICAL
Size
C
Document Number
OCS CONSOLE DISPLAY BOARD
Rev
1.0
Date:
Thursday, June 08, 2000
Sheet 2 of 2

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